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PACKING AND PORTAGING

BY DILLON WALLACE





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BY

DILLON WALLACE

Author of "The Lure of the Labrador Wild," "The
Long Labrador Trail," "Saddle and Camp in
the Rockies," "Across the Mexican
Sierras," etc.



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PACKING AND PORTAGING

CHAPTER I

PACKING AND THE OUTFIT

ORDINARILY the verb *to pack* means to stow articles snugly into receptacles, but in the parlance of the trail it often means to carry or transport the articles from place to place. The *pack* in the language of the trail is the load a man or horse carries.

Likewise, a *portage* on a canoe route is a break between navigable waters, over which canoe and outfit must be carried; or the word may be used as a verb, and one may say, "I will portage the canoe," meaning "I will carry the canoe." In the course of the following pages these terms will doubtless all be used in their various significations.

Save for the few who are able to employ a retinue of professional guides and packers to attend to the details of transportation, the one

chief problem that confronts the wilderness traveler is that of how to reduce the weight of his outfit to the minimum with the least possible sacrifice of comfort. It is only the veriest tenderfoot that deliberately endures hardships or discomforts where hardships and discomforts are unnecessary. Experienced wilderness travelers always make themselves as comfortable as conditions will permit, and there is no reason why one who hits the trail for sport, recreation or health should do otherwise.

In a description, then, of the methods of packing and transporting outfits the tenderfoot and even the man whose feet are becoming calloused may welcome some hints as to the selection of compact, light, but, at the same time, efficient outfits. These hints on outfitting, therefore, I shall give, leaving out of consideration the details of camp making, camp cookery and those phases of woodcraft that have no direct bearing upon the prime question of packing and transportation on the trail.

Let us classify the various methods of wilderness travel under the following heads: 1. By Canoe; 2. With Saddle and Pack Animals; 3. Afoot in Summer; 4. On Snowshoes; 5. With Dogs and Sledge. Taking these in order, and giving our attention first to canoe

travel, it will be found convenient further to subdivide this branch of the subject and discuss in order: (a) The Canoe and its Equipment; (b) Camp Equipment for a Canoe Trip; (c) Personal Equipment; (d) Food; (e) The Portage.

CHAPTER II

THE CANOE AND ITS EQUIPMENT

A SIXTEEN-FOOT canoe with a width of at least 33 inches and a depth of at least 12 inches will accommodate two men, an adequate camping outfit and a full ten weeks' provisions very nicely, and at the same time not lie too deep in the water. A fifteen-foot canoe, unless it has a beam of at least 35 inches and a depth of 12 inches or more, is unsuitable. Three men with their outfit and provisions will require an eighteen-foot canoe with a width of 35 inches or more and a depth of no less than 13 inches, or a seventeen-foot canoe with a width of 37 inches and 13 inches deep. The latter size is lighter by from ten to fifteen pounds than the former, while the displacement is about equal.

The best all-around canoe for cruising and hard usage is the canvas-covered cedar canoe. Both ribs and planking should be of cedar, and only full length planks should enter into the

construction. Where short planking is used the canoe will sooner or later become hogged—that is, the ends will sag downward from the middle.

In Canada the “Peterborough” canoe is more largely used than the canvas-covered. These are to be had in both basswood and cedar. Cedar is brittle, while basswood is tough, but the latter absorbs water more readily than the former and in time will become more or less waterlogged.

Cruising canoes should be supplied with a middle thwart for convenient portaging. Any canoe larger than sixteen feet should have three thwarts. To lighten weight on the portage, and provide more room for storing outfit, it is advisable to remove the cane seats with which canvas canoes are usually provided. This can be readily done by unscrewing the nuts beneath the gunwale which hold the seats in position.

Good strong paddles—sufficiently strong to withstand the heavy strain to which cruising paddles are put—should be selected. On the portage they must bear the full weight of the canoe; they will frequently be utilized in poling up stream against stiff currents; and in running rapids they will be subjected to rough usage. On extended cruises it is advisable to

carry one spare paddle to take the place of one that may be rendered useless.

Experienced canoemen pole up minor rapids. Poles for this purpose can usually be cut at the point where they are needed, but pole "shoes"—that is, spikes fitted with ferrules—to fit on the ends of poles are a necessary adjunct to the outfit where poling is to be done. Without shoes to hold the pole firmly on the bottom of the stream the pole may slip and pitch the canoeman overboard. The ferrules should be punctured with at least two nail holes, by which they may be secured to the poles, and a few nails should be carried for this purpose.

A hundred feet or so of half-inch rope should also be provided, to be used as a tracking line and the various other uses for which rope may be required.

CHAPTER III

CAMP EQUIPMENT FOR A CANOE TRIP

PERSONAL likes and prejudices have much to do with the form of tent chosen. My own preference is for either the "A" or wedge tent, with the Hudson's Bay model as second choice, for general utility. Either of these is particularly adapted also to winter travel where the tent must often be pitched upon the snow. If, however, the tent is only to be used in summer, and particularly in canoe travel where a light, easily erected model is desired, the Frazer tent is both ideal for comfort and is an exceedingly light weight model for portaging.

Duck or drill tents are altogether too heavy and quite out of date. They soak water and are an abomination on the portage. The best tent is one of balloon silk, *tanalite*, or of extra light green waterproofed tent cloth. The balloon silk tent is very slightly heavier than either of the others, but is exceedingly durable. For instance, a 7 1-3 x 7 1-3 foot "A" tent of

either tanalite or extra light green waterproof tent cloth, fitted with sod cloth, complete, weighs eight pounds, while a similar tent of waterproof balloon silk weighs nine pounds. A Hudson's Bay model, 6 x 9 feet, weighs respectively seven and seven and one-half pounds.

These three cloths are not only waterproof and practically rot proof, but do not soak water, which is a feature for consideration where much portaging is to be done and camp is moved almost daily.

Some dealers recommend that customers going into a fly or mosquito country have the tent door fitted with bobbinet. The idea is good, but cheese cloth is much cheaper and incomparably better than bobbinet.

The cheese-cloth door should be made rather full, and divided at the center from tent peak to ground, with numerous tie strings to bring the edges tight together when in use, and other strings or tapes on either side, where it is attached to the tent, to reef or roll and tie it back out of the way when not needed.

When purchasing a light-weight tent, see that the dealer supplies a bag of proper size in which to pack it.

A pack cloth 6 x 7 feet in size, of brown waterproof canvas weighing about 3 1-2 pounds, makes an excellent covering for the tent floor

at night. On the portage blankets and odds and ends will be packed and carried on it. If one end and the two sides of the pack cloth are fitted with snap buttons it may be converted into a snug sleeping bag with a pair of blankets folded lengthwise, the bottom and sides of the blanket secured with blanket safety pins as a lining for the bag.

My standby for summer camping is a fine all-wool gray blanket 72 x 78 inches in size and weighing 5 1-2 pounds. This I have found sufficient even in frosty autumn weather—always, in fact, until the weather grows cold enough to freeze streams and close them to canoe navigation. Used as a lining for the improvised pack cloth sleeping bag, this blanket is quite bedding enough and makes an exceedingly comfortable bed, too.

A three-quarter axe with a 24- or 28-inch handle makes a mighty good camp axe. A full axe is heavy and inconvenient to portage and the lighter axe will serve every purpose in any country at any time. Personally I favor the Hudson's Bay axe. This may be had fitted either with a 24-inch or 18-inch handle. In the two-party outfit which we are discussing there should be two axes, one of which may be fitted with the shorter handle, but the other should have at least a 24- and preferably a

28-inch handle. Every axe should have a leather sheath or scabbard for convenient packing. The so-called pocket axes are too small to be of practical use. The camper does not wish to miss the luxury of the big evening camp-fire, and he can never provide for it with a small hatchet or toy pocket axe.

Cooking utensils of aluminum alloy are the lightest and best for the trail. Tin and iron will rust, enamel ware will chip, and unalloyed aluminum is too soft and bends out of shape. The best sporting goods dealers carry complete outfits of aluminum alloy. I have used them in the frigid North and in the tropics, in canoe, sledging, tramping and horseback journeys, and can recommend them unequivocally, save perhaps the frying pan.

The two-man cooking and dining outfit should contain the following utensils:

- 1 Pot with cover 7x6½ inches, capacity three quarts.
- 1 Coffee pot 6x6¼ inches, capacity two quarts.
- 1 Steel frying pan 9¾x2 inches, with folding handle.
- 1 Pan 9x3 inches, with folding handle, for mixing- and dish-pan.
- 2 Plates 8¾ inches diameter.
- 2 Cups.
- 2 Aluminum alloy forks.
- 2 Dessert spoons.
- 1 Large cooking spoon.
- 1 Dish mop.
- 2 Dish towels.

The regular aluminum alloy cup is too

small for practical camp use. There is an aluminum bowl, however, holding one pint, but without a handle. This is about the right size for a practical cup, and I have a handle riveted on it and use it as a cup. The top only of the handle should be attached, that the cups may set one inside the other. The heat conducting quality of aluminum makes it a question whether or not enamel cups are not preferable.

To pack the outfit snugly, set the mixing pan into the frying pan, the handles of both pans folded, place the plates, one on top of the other, in the mixing pan, the cooking pot on top of these, and the coffee pot inside the cooking pot. The cups will fit in the coffee pot. The weight of this outfit complete is 5 1-2 pounds.

A waterproof canvas bag of proper size should be provided in which to pack the utensils. Forks and spoons, wrapped in a dish towel, will fit nicely in the canvas bag alongside the pots.

Waterproof canvas is suggested for the bag, not to protect the utensils but because anything but waterproofed material will absorb moisture and become watersoaked in rainy weather, adding materially to the weight of the outfit.

One of the handiest aids to baking is the

aluminum reflecting baker. An aluminum baker 16 x 18 inches when open, folds to a package 12 x 18 inches and about two inches thick, and fitted into a waterproof canvas case weighs, case and all, about four pounds.

Broilers, fire irons, fire blowers or inspirators, as they are sometimes called, and many other things that are convenient enough but quite unnecessary, should never burden the outfit. Even though the weight of some of them may be insignificant, each additional claptrap makes one more thing to look after. There are a thousand and one claptraps, indeed, that outfitters offer, but which do not possess sufficient advantage to pay for the care and labor of transportation, and my advice is, leave them out, one and all.

Outfitters supply small packing bags of proper size to fit, one on top of another, into larger waterproof canvas bags. These small bags are made preferably of balloon silk. By using them the whole outfit may be snugly and safely packed for the portage.

In one of these small bags keep the general supply of matches, though each canoeist should carry a separate supply for emergency in his individual kit.

In like manner two or three cakes of soap should be packed in another small bag. Float-

ing soap is less likely to be lost than soap that sinks.

A dozen candles will be quite enough. These if packed in a tin box of proper size will not be broken.

Repair kits should be provided. A file for sharpening axes and a whetstone for general use are of the first importance. Include also a pair of pincers, a ball of stout twine and a few feet of copper wire. A tool haft or handle with a variety of small tools inside is convenient. Either a stick of canoe cement, a small supply of marine glue, or a canoe repair outfit such as canoe manufacturers put up and which contain canvas, white lead, copper tacks, calor and varnish will be found a valuable adjunct to the outfit should the canoe become damaged. This tool and repair equipment should be packed in a strong canvas bag small enough to drop into the larger nine-inch waterproof bag.

A small leather medicine case with vials containing, in tabloid form, a cathartic, an astringent (lead and opium pills are good) and bichloride of mercury, suffices for the drug supply. Surgical necessities are: Some antiseptic bandages, a package of linen gauze, a spool of adhesive plaster and one-eighth pound of absorbent cotton, wrapped in oiled

silk. In addition most campers find it convenient to have in their personal outfit a pair of small scissors. These are absolutely necessary if one is to put on a bandage properly. The regular surgical scissors, the two blades of which hook together at the center, are the most convenient sort, both to use and to carry, and have the keenest edge.

A pair of tweezers takes up but little room and is useful for extracting splinters or for holding a wad of absorbent cotton in swabbing out a wound, as cotton will, of course, become septic if held in the fingers.

A small scalpel is better than the knife blade for opening up an infection, as it is more convenient to handle and will make a deep short incision when desired. These will all be packed in one of the small balloon silk bags.

CHAPTER IV

PERSONAL EQUIPMENT

EACH canoeist should have a personal kit or duffle bag of waterproof canvas. These may be purchased from outfitters and are usually 36 inches deep and of 12, 15, 18 or 21 inches diameter. The 12-inch bag, however, is amply large to accommodate all one needs in the way of clothing and other personal gear. This, as well as every other waterproof canvas packing bag mentioned, excepting the cooking kit bag, should be supplied with a handle on the bottom and one on the side. These bags not only keep the contents dry, but, as previously stated, do not absorb moisture to add to the weight, a very essential feature where every unnecessary pound must be eliminated. I was once capsized in a rapid and my duffle bag lay half a day in the water before it was recovered. The contents were perfectly dry.

One suit of medium weight woolen underclothing in addition to the suit worn is ample

for a short trip. Four extra pairs of thick woolen socks should be provided—the home-knit kind. An excellent material for trousers to be worn on the trail is moleskin, though for midsummer wear a good quality khaki is first rate. Moleskin, however, will withstand the hardest usage and to my mind is superior to khaki or any other material where wading is necessary and on cold or rainy days, as it is very nearly windproof. A good leather belt should be worn, even though suspenders support the trousers.

The outer shirt should be of light weight gray or brown flannel and provided with pockets. A blue flannel shirt of the best quality is all right. The cheaper qualities of blue crock, and this feature makes them objectionable. If the outer shirt is too heavy it will be found cumbersome under the exertion of the portage.

A large, roomy Pontiac shirt to slip over the outer shirt and use as a sweater is much preferable to a sweater on the trail. It is windproof and warm. Do not take a coat—the Pontiac shirt will be both coat and sweater. A coat is always in the way on a canoe trip and makes the pack that much heavier.

A pair of low leather or canvas wading shoes for river work and larrigans or shoe

paces for ordinary wear, large enough to admit two pairs of woolen socks, are best suited to canoeing. Heavy, hobnailed mountaineer shoes or boots are not in place here.

Heavy German socks, supplied with garter and clasp to hold them in position, are better than canvas leggings, and protect the legs from chill at times when wading is necessary in icy waters.

Any kind of an old slouch hat is suitable.

Some canoeists take with them a suit of featherweight oilskin. Personally I have never worn rainproof garments when canoeing. Once I carried a so-called waterproof coat, but it was not waterproof. It leaked water like a sieve, and was no protection even from the gentlest shower. I am inclined, however, to favor featherweight oilskins, though not while portaging—they would be found too warm—but when paddling in rainy weather, or to wear on rainy days about camp.

If the trip is to extend into a black fly or mosquito region, protection against the insects should be provided. A head net of black bobbinet that will set down upon the shoulders, with strings to tie under the arms, is about the best arrangement for the head. Old loose kid gloves, with the fingers cut off, and farmers' satin elbow sleeves to fit under the wrist bands

of the outer shirt will protect the wrists and hands. The armlets should be well and tightly sewn upon the gloves, for black flies are not content to attack where they alight, and will explore for the slightest opening and discover some undefended spot. They are, too, a hundred times more vicious than mosquitoes.

There are many receipts for fly dope, but in a half hour after application perspiration will eliminate the virtue of most mixtures and a renewed application must be made. Nessmuk's receipt is perhaps as good as any, and the formula is as follows:

Oil of pine tar.....	3 parts
Castor oil.....	2 parts
Oil of pennyroyal.....	1 part

If when you were a child your father held your nose as an inducement for you to open your mouth while your mother poured castor oil down your throat, the odor of the castor oil rising above the odors of the other ingredients will revive sad memories. Indeed it is claimed for this mixture that the dead will rise and flee from its compounded odor as they would flee from eternal torment. It certainly should ward off such little creatures as black flies and mosquitoes.

Another effective mixture is:

Oil of tar.....	3 parts
Sweet oil.....	3 parts
Oil of pennyroyal.....	1 part
Carbolic acid.....	3 per cent.

An Indian advised me once to carry a fat salt pork rind in my pocket, and now and again rub the greasy side upon face and hands. I tried it and found it nearly as good as the dopes.

Unless one penetrates, however, far north in Canada during black fly season these extraordinary precautions will scarcely be necessary. There is nowhere in the United States a region where black flies are really very bad (though perhaps I am drawing invidious comparisons in making the statement), and even in interior Newfoundland they are, compared with the farther north, tame and rather inoffensive though always troublesome.

The choice of fishing tackle, guns and arms depends largely upon personal taste. Steel rods of the best quality will serve better than split bamboo on an extended trip where one, continuously on the portage trail, is often unable to properly dry the tackle. The steady soaking of a split bamboo rod for a week is likely to loosen the sections and injure a fine rod. A waterproof canvas or pantasote case

is the right sort for the rod—leather cases are unpractical on a cruising trip.

Leather gun cases, too, under like circumstances will become watersoaked, and under any circumstances they are unnecessarily heavy. Use canvas cases therefore in consideration for your back. They are light and in a season of rain immeasurably better than leather.

Economize, also, on ammunition. Do your target practice before you hit the trail. A hunter that cannot get his limit of big game with twenty rifle cartridges is an unsafe individual to turn loose in the woods.

For spruce grouse, ptarmigan and other small game a ten-inch barrel, 22-caliber single-shot pistol is an excellent arm, provided one has had some previous experience in its use. It is not a burden on the belt, and a handful of cartridges in the pocket are not noticed.

Pack your cartridges in a strong canvas bag, your gun grease and accessories in another receptacle.

On the belt also carry a broad-pointed four-inch blade skinning knife of the ordinary butcher knife shape. This will be your table knife, as well as cooking and general utility knife.

In the pocket carry a stout jackknife, a

waterproof matchbox, always kept well filled, and a compass.

A film camera is more practical for the trail than a plate camera for many reasons, one of which is weight. Plates are heavy and easily broken. It is well to have each roll of films put up separately in a sealed, water-tight tin. Dealers will supply them thus at five cents extra for each film roll. A waterproof pantasote case, too, is better than leather, for leather in a long-continued rain will become watersoaked, as before stated.

If a plate camera is carried the plates may be packed in a small light wooden box—a starch box, for instance. The box will protect them under ordinary circumstances. Film rolls, however, may be carried in a small canvas bag that will slip into one of the larger waterproof bags.

My object in outlining outfit is rather to emphasize the possibilities of selecting a light and efficient outfit that may be easily packed and transported on the trail, than to evolve an infallible check list; therefore I shall not attempt to name in detail toilet articles, tobacco and odds and ends. Take nothing, however, save those things you will surely find occasion to use, unless I may suggest an extra pipe, should your pipe be lost. A small balloon silk bag will

hold them, together with a sewing case containing needles, thread, patches and some safety pins. Another will hold the hand towels and hand soap in daily use, while an extra hand towel may be stowed in your duffle bag.

In concluding this chapter it may be pertinent to say that the novice on the trail is pretty certain to burden himself with many things he will seldom or never use. Take your outfitter into your confidence. Tell him what sort of a trip you contemplate and he will advise you. First-class outfitters are usually practical out-of-door men and camping experts. They have made an extended study of the subject, for it is part of their business to do so. Therefore, in selecting outfit, it is both safe and wise to rely upon the advice of any responsible outfitter.

CHAPTER V

FOOD

THE true wilderness voyager is willing to endure some discomforts on the trail, to work hard and submit to black flies and other pests, but as a reward he usually demands satisfying meals. There is, indeed, no reason for him to deny himself a variety and a plenty, unless his trip is to extend into months. Weight on the portage trail is always the consideration that cuts down the ration. Packing on one's back a ration to be used two or three months hence is discouraging.

I have evolved a two-week food supply for two men, based upon the United States army ration, varied as the result of my own experiences have dictated. It offers not only great variety, but is an exceedingly bountiful ration even for hungry men. Personal taste will suggest some eliminations or substitutions that may be made without material loss or change in weight. If there is certainty of catching fish or killing game, or if opportunity offers for purchasing fresh supplies along the trail, re-

ductions in quantity may be made accordingly. For each additional man, or for any period beyond two weeks, a proportionate increase in quantity may be made.

- Bacon, 6 pounds.
- Salt fat pork, 2 pounds.
- Ham or canned meats, 5 pounds.
- "Truegg" (egg powder), 1 pound (equals 4 dozen eggs.)
- "Trucream" (milk powder), 1½ pounds.
- "Crisco," 3 pounds, (2 cans).
- Fresh bread, 2 pounds.
- Flour, 12 pounds.
- Corn meal (yellow), 1 pound.
- Rolled oats, 1 pound.
- Rice, 1 pound.
- Baking powder, ½ pound.
- Potatoes (Dehydrated) riced, 2 pounds (equals 14 lbs. fresh potatoes).
- Potatoes (Dehydrated) sliced, 1 pound (equals 7 lbs. fresh potatoes).
- Carrots (Dehydrated), ¼ pound (equals 3 lbs. fresh carrots).
- Onions (Dehydrated), ¼ pound (equals 3¾ lbs. fresh onions).
- Cranberries (Dehydrated), ¼ pound (equals 2½ qts. fresh fruit).
- Beans, 2 pounds.
- Green peas (Dehydrated), ¼ pound (equals 1¼ lbs. fresh peas).
- Coffee (ground), 2 pounds.
- Tea, ½ pound.
- Cocoa, ½ pound.
- Sugar (granulated), 5 pounds.
- Preserves, 1 pound.
- Lemons, ½ dozen.
- Lime tablets, ½ pound.
- Prunes (stoned), 1 pound.
- Raisins, 1 pound.
- Salt, 1 pound.
- Pepper, ¼ ounce.

This gives each man a nominal ration of

14 1-2 pounds a week, or about two pounds a day. In reality, however, it is more bountiful than the summer garrison ration and far more liberal than the summer marching ration of the army. This is brought about by the pretty general elimination of water, largely through the substitution of dehydrated vegetables and fruits for fresh and canned goods. The dehydrated products designated are in every particular equal to fresh products and far superior to canned goods. Dehydrated vegetables possess all the qualities, in fact, of fresh vegetables, with only the large percentage of water removed. Water is introduced restoring them to original form usually by boiling. No chemical is used as a preservative as is the case with all dried vegetables put up by foreign manufacturers.

It will be noticed that butter has been omitted and that "Crisco" has been introduced in the place of lard and to be used in cooking instead of butter. Crisco is a product of edible vegetable oils. It has the appearance of lard but can be heated to a much higher temperature without burning, is fully equal to butter when used as shortening, and dough bread, fish or other articles of food fried in it will not absorb it so readily as they will lard, nor will it transmit the flavor of one food to another. For

example, fish may be fried in Crisco, and dough bread or anything else fried in the same Crisco will have not the slightest flavor of fish. It will keep fresh and sweet under conditions that turn lard and butter rancid. Butter quickly becomes strong, and the heat of the sun keeps it in an oily, unpalatable condition, even when packed in air-tight tins. The most lavish user of butter will discover that it is no hardship to go without it when in camp. Crisco, put up in handy, friction-top cans, can be purchased from nearly any grocer.

Coffee should be carried in friction-top tins. On extended trips coffee is too bulky to carry save as a special treat. A pound of tea will go as far as many pounds of coffee; therefore on trips extending beyond three or four weeks the proportion of tea should be increased and that of coffee diminished. On short trips, however, such as we are discussing, there is no reason and most Americans usually prefer it even when in camp.

Each article of food should have its individual bag, to fit into one of the larger waterproof canvas bags described, though the bacon and fat pork, each piece wrapped in paraffin (waxed) paper, may be packed in one bag. Paraffin paper will protect other packages in the bag from grease. Several articles of small

bulk and weight such as dehydrated carrots, onions, cranberries and green peas each in its original package or a small muslin bag suitable in size may be carried in a single balloon silk bag. The small bags containing such articles as are not in daily and frequent use should be stowed in the bottoms of the canvas bags, while those in constant demand should be at the top where they can be had without unpacking the entire bag. Every package or bag should be plainly labeled with the nature of its contents. In labeling them use ink, as pencil marks are too easily obliterated. Where a party is composed of a sufficient number of people to make it worth while the party ration for each day may be weighed out and packed in a separate receptacle, thus making seven food packages for each week. This, however, would be obviously unpractical where there are less than eight or ten members of the party.

No glass or crockeryware should be used, not only because of its liability to break, but because of its unnecessary weight.

A good way to carry the tin of baking powder is to sink it into the sack of flour. The flour will protect it and preclude the possibility of the cover coming off and the contents spilling out. Do not carry prepared or self-raising flour on the trail. For many reasons it is un-

practical for trail use, though perhaps most excellent in the kitchen at home.

Throughout I have accentuated the advisability of waterproof covers for everything. Every ounce of water absorbed by tent, bags, or package covers, adds to the tedium of the trail by so much unnecessary weight. When flour carried in an ordinary sack is exposed to rain a paste will form next the cloth, and presently harden into a crust that will protect the bulk of flour from injury. But the flour used up in the process of crust forming is a decided waste, and the paste, retaining a degree of moisture, increases weight.

I have suggested balloon silk for the small food bags to fit into the larger waterproofed canvas bags, not only because it does not absorb moisture, but because there will be no possibility of the contents sifting through the cloth. If these or the cloth from which to make them cannot be readily obtained, closely woven muslin will do.

Should the canoeist desire to make his own bags and should he not find it convenient to purchase waterproofed canvas, the ordinary canvas which he will use may be waterproofed by the following process:

In two gallons of boiling water dissolve three and one-half ounces of alum. Rain water is

best, though any soft water will do; but it *must be soft water* to obtain the best results. In another vessel dissolve four ounces of sugar of lead in two gallons of soft water. Unite the solutions when they have cleared by pouring into another vessel No. 1 first, then No. 2. Let the solution stand over night, decant it into a tub, free of any sediment that may have settled, and it is ready for the canvas. The cloth should be put into the solution, thoroughly saturated with it and then lightly wrung out, and hung up to dry. This treatment will render canvas to a considerable extent, though not completely, waterproof.

Muslin for the smaller food bags may be waterproofed by painting it with a saturate solution of turpentine and paraffin.

Canned goods should be packed snugly in canvas bags, with cans on end, that the sides, not the corners or edges, will rest against the back in portaging.

Camp chests in which to store food or other articles are carried by some canoeists, but they add considerable weight to the outfit. The best and most serviceable camp chest is one of indestructible fiber. One with an inside measurement of 18 x 24 x 12 inches weighs twenty pounds.

CHAPTER VI

THE PORTAGE

THERE are several types of pack harness offered by outfitters, but it is generally conceded that the best method of carrying heavy or medium-weight packs is with the tump line. In tump line carrying the pack is supported by a broad band of leather passed across the head—high up on the forehead—thus throwing the weight upon the strong muscles of the neck, with no shoulder straps or other support.

Canadian voyageurs, Hudson's Bay Company packers and Indians use the tump line to the exclusion of all shoulder-carrying devices. Indeed, by no other method would it be possible for them to transport upon their backs through a rough country the heavy burdens which they are called upon to carry. Experienced packers with the tump line will sometimes portage loads of upwards of four hundred pounds. In tests of skill I have seen a man carry in a single load the contents of three barrels of flour—588 pounds.

The tump line consists of a broad piece of leather some eighteen or twenty inches in length (known as the head strap or head-piece), with a leather thong usually about seven feet in length attached to each end, the total length from the tip end of one thong to the tip end of the other thong averaging about sixteen feet.

Sometimes the two thongs are sewn to the headpiece, and again the line is a single strip of leather, broadened in the center to form the headpiece. The best tump lines, however, have the head strap as a separate piece with a buckle at each end by which the thongs are attached. This arrangement admits of adjustment, if necessary, to suit the individual after the pack has been made up.

There is a knack in tump line carrying, but the following directions for making up various packs will give the novice sufficient insight, with a little experience, to enable him to acquire the art.

When the pack is to be made up wholly of bags, lay the tump line on the ground with the thongs parallel to each other and from sixteen to twenty inches apart, depending upon the length of the bags to be packed. Place the bags across the thongs, one bag upon another, taking care that the thongs are not so near the

ends of the bags as to render them liable to slip off when the pack is tied. Now lift the head strap above the top bag and secure the pack by drawing the loose end of each thong in turn tight around the bags and knotting it a few inches below the buckle that attaches its other end to the headpiece.

When a pack cloth is to be used, spread the pack cloth upon the thongs of the tump line, stretched upon the ground in the manner above described, and in the center of the pack cloth lay folded blankets and other articles to be packed, making the pile about two feet long, and taking care that hard substances are in the center, with blankets and soft things outside. Now turn the sides of the pack cloth over the pack and fold over the ends. If a bag is to be included, lay it upon the pack after the cloth has been folded, and secure the whole as in the former case.

Another method of making up a pack with the pack cloth, common among Canadian voyageurs, is as follows: Spread the cloth upon the ground, and lay the tump line across it, the headpiece near one end and the thongs a foot from the sides. Fold the sides of the cloth inward over each thong. Now build up the pack in a neat pile about two feet long on the folded cloth, taking care as before that hard things

are placed in the middle. Fold the end of the pack cloth with protruding thongs over the pack, take a half turn with the loose end of a thong around the other end near the headpiece, draw it tight until the end is closely puckered, then knot it and draw up the other thong and secure it in like manner. Now bring the free ends of the tump line to center of pack, on top, cross them and pass them around middle of pack and tie.

The knack of comfortable tump line carrying once the neck muscles have become developed and hardened to the work is in properly balancing the pack. With the headpiece resting high up upon the forehead the pack should hang with its bottom no lower than the hips. Neither should it be too high. A little experimenting will teach just where the proper balance is to be found. If it is too high, lengthen the line, or if too low shorten it by means of the buckles which attach the thongs to the headpiece.

Experienced packers pile additional bags or bundles on top of the pack, the uppermost bundle standing higher than the head. In my own experience I have found that an additional bag thus placed upon the pack and resting against the back of my neck helped balance the load. My favorite bag for this purpose is a

forty or fifty pound bag of flour, sometimes surmounted by a lighter bundle which rested partly upon the flour and partly upon my head.

The tenderfoot will be quite content to limit his early loads to sixty or seventy pounds, and even then his first portages will not be what he can conscientiously term experiences of unalloyed joy. Gradually, however, he will learn the knack of tump packing and at the end of a couple of weeks of daily experience will find himself able to negotiate a load of one hundred pounds with some ease.

All the various types of pack harness are supplied with straps by which the pack is secured and loops through which to slip the arms, the pack being carried from the shoulders instead of the head. With this sort of a pack, as with the tump line, care should be given to the proper adjustment, with the bottom of the pack no lower than the hips. Fifty pounds is about as heavy a load as one can comfortably carry from the shoulders.

Outfitters sometimes attach a headpiece to their pack harness—that is to say the harness is provided with both shoulder loops and tump line head strap. The object is to secure a division of weight between shoulders and head. This is a method employed by Eskimos when hunting without dogs. The Eskimo hunter

binds his pack with sealskin thongs, and manipulates a single thong in such a manner as not only to secure the pack but to form arm loops and headpiece as well.

No matter what type of shoulder harness is employed, a breast strap must be used to fasten together the arm loops in front or the loops will have a continual tendency to slip backward and off the shoulders. This breast strap fastens the packer so securely to his pack that should he slip, as is sometimes likely, the pack will carry him down with it and the probability of injury is multiplied many times. This alone is a very decided objection to all forms of pack harness.

If one slips with a tump line, on the contrary, a slight twist of the head will disengage and free one from the pack; and if one is hunting the tump pack may readily be dropped at a moment's notice, should game be sighted.

Let me therefore urge the adoption of the tump line for all portage work where fifty pounds or more must be transported. No experienced packer will use harness. Harness packing is indeed indicative of the tenderfoot who has never learned how, unless on long cross country tramps with light loads.

But on a canoe trip, if one would make progress, big loads must be resorted to. For in-

stance, if the canoeist has a two mile portage to negotiate and one hundred pounds of duffle he has but two miles to walk if he carries all his duffle at once, but if he makes two loads of it he must walk six miles. With the hundred pound load the portage may easily be covered in one hour. With fifty pound loads three hours will be consumed, for there will be time lost in making up the second pack.

Axes, guns and extra paddles may be thrust under the thongs of the tump line, or carried in the hand. Never portage a rifle with a cartridge in the chamber, and never portage a loaded shotgun. To disregard this advice will be to take an unnecessary and foolhardy risk.

Save in a rather stiff breeze, one man can carry a canoe weighing less than one hundred pounds nearly as easily as two can carry it. There is one best way of doing everything, and the best and most practical way to carry a canoe is the Indian's way.

Tie one end of a stout string or thong securely to the middle thwart close to the gunwale, and the other end to the same thwart close to the opposite gunwale with the string stretched taut from end to end of the thwart and on top of it. Slip the blades of two paddles, lying side by side, under the string, the paddle handles lying on the forward thwart.

With the handles as close together as they will lie, bind them with a piece of rope or thong to the center of the forward thwart.

Spread the blades upon the middle thwart sufficiently wide apart to admit your head between them. Take a position on the left side of the canoe facing the stern. Just forward of the middle thwart grasp the gunwale on the opposite or right side of the canoe in your left hand and the gunwale on the near or left side in your right hand, and, lifting the canoe over your head, let the flat side of the paddles directly forward of the middle thwart rest upon the shoulders, your head between them. It will be found that though you faced the stern in lifting the canoe you are now facing the bow, and with the bow slightly elevated the canoe can be carried with ease and a view of the trail ahead will not be shut out.

Should the flat paddle blades resting upon the shoulders be found uncomfortable, as they doubtless will at the end of the first two or three hundred yards, a Pontiac shirt or sweater will serve as a protecting pad.

Outfitters offer for sale yokes, pneumatic pads and contrivances of various sorts as protections for the shoulders, but these contrivances elevate the canoe from two to four inches above the shoulders and this increases the diffi-

culty of steadying it on rough trail. The sweater or Pontiac shirt eases the cutting effect of the paddles just as well as any of the special portaging pads, and the canoe can be handled more easily with it. Besides it makes one less thing to look after.

In a strong breeze it is often difficult for one man to handle a canoe, for the wind striking it on the side will turn the portager around and he will find it impossible to keep his course in spite of his best efforts. If the portage is a short one—two or three hundreds yards—the canoe may be carried very well, one man with the bow the other with the stern upon a shoulder, the canoe on its side with the bottom next the portagers' heads, that they may easily grasp the gunwale in one hand and steady the canoe with the other.

This position will soon be found exceedingly tiresome, and on portages exceeding two or three hundred yards the paddles should be arranged with the blades on the after thwart and the handles lashed to the center of the middle thwart. With this arrangement one man carries exactly as when portaging the canoe alone, save that he stands under the canoe just forward of the after thwart instead of the middle thwart, while the other man carries the bow

upon one shoulder. This is the easiest method of two-man portaging of which I know.

Many odds and ends may be tucked in the canoe on the portage—fishing rods, for example, in cases, with one end stuck in the bow and the other end tied to the forward thwart.

Should a canvas canoe become punctured it may be repaired by one of the following methods:

If a stick of canoe cement is in the outfit, heat the cement with a match and smear it over the puncture.

Should the outfit contain a canoe repair kit, cut a patch of canvas somewhat larger than the puncture, apply a coat of white lead to the puncture and over a marginal space as large as the canvas patch, press the patch firmly and evenly upon the white lead and tack it down with copper tacks. To this apply calor, and when dry complete the repairs with a coat of varnish.

Should marine glue be used, lay a sheet of it over the puncture, heat the bottom of a cup or some other smooth metal utensil and rub it over the glue until the glue melts sufficiently to fill the puncture.

In a region where spruce gum can be had, melt a quantity of gum in a frying pan with

sufficient grease to take from the gum its brittle quality when cold. While hot pour the gum upon the rupture, letting it run well into the opening and smearing it smoothly over the outside.

“Peterborough” canoes are also easily repaired with marine glue or gum.

In loading the canoe place the heavier bags in the bottom and middle of the canoe, taking care so to distribute the weight that when fully loaded the canoe will lie on an even keel. Keep the load always as low down as possible. Every bag rising above the gunwales offers resistance to the wind, and tends to make the load topheavy. When but one man occupies a canoe, however, sufficient weight should be carried forward to counterbalance his weight in the stern.

Lash everything fast, particularly in rough water or when running rapids. It does not pay to take chances. With a companion I was once turned over in a rapid in an unexplored, sparsely timbered wilderness several hundred miles from the nearest base of supplies—a Hudson’s Bay trading post. Nearly all our food was lost, as well as guns, axes, cooking utensils and many other necessities of travel. The temperature stood close to zero, snow covered the ground and during the greater part of

the three weeks occupied in reaching the post we had to dig driftwood from under the snow, and our ingenuity was taxed at times to the utmost in efforts to protect ourselves from the elements and travel with any degree of comfort. Nothing worse than an unpleasant ducking in icy waters would have resulted from our accident had we observed the rule of ordinary caution and lashed our outfit to the thwarts.

One end of a rope tied to the forward thwart, the other end threaded through bag handles or pack lashings and secured to the after thwart, will do the trick. A short strap, one end attached to a thwart, the other end supplied with a snap to fasten on rifle or shotgun cases, is a good way to secure the guns and still have them readily accessible.

If you would make speed be smart in unloading the canoe and making up your packs on the portage, and equally smart in reloading the canoe. Delays in loading, unloading and making up packs are the chief causes of slow progress.

When it is found necessary to "track," give the rear end of the tracking line a turn around the forward thwart, on the land side of the canoe, then pass the end back and secure it to the middle thwart. This distributes the strain between the thwarts. While one man at the

farther end of the line tows the canoe, the other man with a pole may walk upon the bank, and keep the canoe clear of snags, if the water is deep. Should the water be shallow it will usually be found necessary for him to wade and guide the bow through open channels.

CHAPTER VII

TRAVEL WITH SADDLE AND PACK ANIMALS

UNDER this head we shall consider: (1) (2) Saddles and pack equipment; (3) Animals best adapted to pack work; Outfit and provisions and how to pack them; (4) How to throw some practical hitches; (5) Equipment of the traveler who has no pack animal and whose saddle horse is required to transport both rider and equipment.

Comfort on the trail depends to a very large degree upon the animals of the outfit. A mean horse is an abomination, and a horse may be mean in many respects. A bucking horse, a horse that shies at stumps and other objects or at every moving thing, or one that is frightened by sudden and unexpected sounds is not only an uncomfortable but unsafe animal to ride upon rugged mountain trails; and a horse that will not stand without hitching, or one that is hard to catch when hobbled and turned loose, will cause no end of trouble.

In choosing a horse, then, avoid so far as possible one with these tendencies, and also ob-

serve the manner in which he handles his feet. He should not be subject to stumbling. He should be sure-footed, steady and reliable, to qualify him for work on dangerous trails; this is of the first importance. A horse that does not keep his eyes on the trail and select his footing with care is wholly unsuited to mountain work. He should be gunwise. A gunwise horse will not be easily frightened by sudden and unexpected noises.

Whether intended for mountain or plains work, the horse should be a good camp animal—that is, one that will not wander far from camp. It is more than aggravating to find upon arising in the morning that your horse has disappeared and one always feels that time consumed in searching for a roving horse is time worse than wasted. Of course this tendency of an animal can be forestalled by picketing him, but a picketed horse unless forage be particularly good will not do well, for it rarely happens in these days of sheep-ravaged ranges that an animal can find sufficient food to meet his requirements within the limited length of a picket rope.

Some horses need much persuasion before they can be induced to ford streams, and I have had them lose their nerve and decline the descent of precipitous trails. An animal possess-

ing this trait of timidity is not suited to trail work, for he is likely to cause trouble at a critical moment.

Some horses are good foragers, others are not. A poor forager will become leg weary and break down much more quickly than the animal that takes advantage of every opportunity to graze or browse. A horse just in from the open range should be round and full-bellied. This is an indication that he is a good feeder. Generally speaking the chunky horse is the one best adapted to arduous trail work because he usually possesses greater powers of endurance than the longer, lankier type.

All of the qualifications above enumerated should be borne in mind in selecting animals, whether for saddle or pack use. And of course the animals should be as sound as possible. One should never start upon a journey with an animal that is lame or has cinch sores or galled back.

When mountain trails are to be negotiated a saddle horse weighing from nine hundred to a thousand pounds will be found better adapted to the work than a larger animal. Too large a horse is liable to be clumsy on the trail, while too light a horse will of course tire under a heavy rider. A small horse, as a rule, is better able to forage a living than a large horse, and

for this reason stands up better with a moderate load on long, continuous journeys. Ponies weighing from eight hundred to eight hundred and fifty pounds will pack one hundred and fifty pounds easily, and ponies of this size make much better pack animals than larger ones.

While for general saddle work I prefer a horse, a mule is surer footed and therefore preferable on precipitous, narrow mountain trails. In the Sierra Madres of Mexico I rode a mule over trails where I would scarcely have trusted a horse. Good saddle mules, however, are scarce. I never saw a really good saddle-broke mule north of Mexico, though they are doubtless to be had. Mules have greater powers of endurance than horses, and for many other reasons are superior as pack animals. The chief objection to a mule is his timidity upon marshy trails. His feet are much smaller than those of a horse, he mires easily, and he is fully aware of the fact. A good mule, nevertheless, is the one best all-around pack animal.

Burros are good where forage is scarce, but they are slow. When the burro decides that he has done a day's work he stops, and that is the end of it. He will not consult you, and he will not take your advice. When he fully decides that he will go no farther you may as well un-pack and make camp with as good grace as

you can muster, and keep your temper. I believe that burros have a well-organized labor union and they will not do one stroke of work beyond the limit prescribed by their organization. But one must sometimes resort to them in desert travel. They will pick their living and thrive on sage brush wastes where other animals would die, and their ability to go long without water is truly remarkable. On rough mountain trails they are even more sure-footed if possible than mules, but like the mule it is difficult to force them over marshes or into rivers when fording is necessary.

In horse-raising localities in the West very good horses can be had at anywhere from thirty to seventy-five dollars. The usual rate for horse rental is one dollar to one dollar and a half a day, and it is therefore cheaper, when the journey is to extend to a month or more, to purchase the animals outright and sell them when you are finished with them for what they will bring. Rented animals are generally animals of low value and sometimes not very efficient, and in the course of a month one pays in rental a good share of the value of the horse. The risk is no greater, for if a rented horse is injured while in a traveler's possession, the owner holds him who has rented the animal responsible for the damage.

CHAPTER VIII

SADDLE AND PACK EQUIPMENT

THE riding saddle should be a double cinch, horn saddle, with wool-lined skirts and of ample weight to hold its position. My own is a regular stock saddle weighing thirty-five pounds, though for all ordinary use a twenty-five- or thirty-pound saddle will do just as well.

I prescribe the horn saddle because of its convenience. One may sling upon it a camera, binoculars or other articles in frequent demand, and when it becomes necessary to lead a pack pony the lead rope may be attached to it. For this latter purpose the horn is indeed indispensable.

In the light of personal experience with both single and double cinch saddles, I recommend the latter unhesitatingly, particularly for mountain work. In steep ascents or descents it will not slide, while a single cinch saddle is certain to do so no matter how tightly cinched, and this shifting will sooner or later gall the horse's

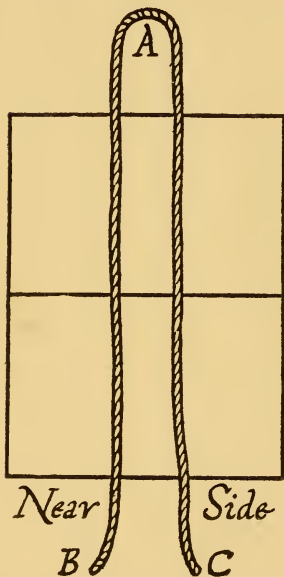
back. In Mexico the single cinch saddle is almost universally used, but who ever saw a Mexican's horse that was free from saddle sores? The forward cinch should preferably be a hair cinch, though the ordinary webbed sort, both forward and rear, does well enough.

The saddle blanket should be a thick, good quality wool blanket. In Arizona Navajo saddle blankets are popular, and they are undoubtedly the best when obtainable. A hair saddle pad or corona, shaped to the animal's back and used in connection with the blanket, is a pretty good insurance against galling, and preferable to the felt pad, for it is cooler.

A leather boot for rifle, and saddle bags for toilet articles, note books and odds and ends, bridle, halter rope, a pair of cowboy spurs with large blunt rowels, and a quirt to tickle delinquent pack horses will be needed. The rifle boot has two sling straps. The usual method of carrying it is to insert it between the stirrup leathers on the near side, drop the sling strap at the top of the boot over the saddle pommel and buckle the sling strap at the bottom of the boot into the rear latigo ring. By detaching the latter sling from the boot before buckling it to the ring, the boot may be removed from or attached to the saddle by simply lifting the forward sling strap over the pommel, without

unbuckling. In case the sling strap at the top of the boot be placed too far down, it should be shifted higher up and secured to the boot with a leather loop which may be riveted to the boot.

For the pack animals the ordinary cross-tree



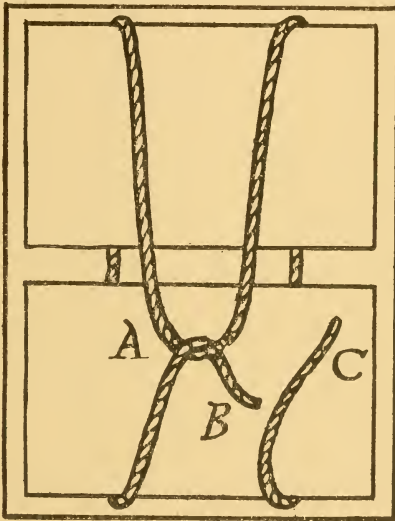
METHOD OF SLINGING LOAD
ON APAREJO

(FIG. I.) Rope is doubled and loop A thrown over horse's back to off side.

N. B.—In this and the following diagrams the pack is represented as spread out flat and viewed from above.

or sawbuck pack saddle is the most practical pack saddle for all-around use, though the aparejo, used by the army and generally throughout Mexico, is superior to the sawbuck when unwieldy packages of irregular size and shape are to be transported. Such packages must frequently be transported by army trains and they are the rule rather than the exception in Mexico, where freighting throughout wide regions must be done wholly on the backs of animals.

The aparejo is of Arabian origin, and the Spaniards, who adopted it from the Moors, introduced it into Mexico. In Mexico there are two types of the aparejo in common use. One made usually of the fiber of *henequen*, which is



Near Side

(FIG. 2.) Packs are now lifted into place and off packer brings loop A up around off side pack to top of load. Near packer passes end B through loop A and ties ends B and C together with square knot. Balance or "break" the packs and load is ready for hitch.

woven into pockets which are stuffed with grass, to form the pads, is used on donkeys in

comparatively light packing; in the other type the pad casing is made of Mexican tanned leather instead of *henequen* matting but also stuffed with grass. This is used in heavier packing with mules, in transporting machinery and supplies to mines and merchandise to inland settlements.

The cross-tree or sawbuck, however, is used almost exclusively in the United States by forest rangers, cowboys, prospectors and pack travelers generally, and it is to this type of pack saddle that we shall direct our attention chiefly. It may be interesting to note that this is a very ancient type of pack saddle, of Asiatic origin. It consists of two saddle boards connected near each end—front and rear—by two cross-pieces, the pommel and cantle forming a miniature sawbuck, while the saddle boards are similar in shape to the McClellan saddle tree. This is fitted with breeching, quarter straps, breast strap, latigos and cinch. As in the case of the riding saddle, the sawbuck pack saddle should be supplied with the double cinch. Care should be taken that the saddle fits the animal for which intended. A saddle either too wide or too narrow will be certain to cause a sore back.

Each pack saddle should be accompanied by a heavy woolen saddle blanket, which should be

folded into three or four thicknesses, for here even greater protection is necessary than with the riding saddle, for the animal is to carry a dead weight.

The preferable method of carrying supplies with the sawbuck pack saddle is with kyacks, basket panniers or the *alforjas*, though with sling and lash ropes any sort of a bundle may be slung upon it.

When they can be obtained, kyacks of indestructible fiber stand first for preference. These are usually from twenty-two to twenty-four inches wide, seventeen or eighteen inches high and about nine inches deep, and are fitted with heavy leather loops for slinging on the saddle. Unless the horse is a large one, the narrower, or twenty-two inch, should be selected.

Basket panniers of similar size are lighter but not so well adapted to hard usage, and are more expensive.

The *alforjas* is constructed of heavy duck and leather, and of the same dimensions as the kyack. They are much cheaper than either panniers or kyacks, and are therefore more commonly used. Any outfitter can supply them. They are slung upon the saddle in the same manner as kyacks. A pair of the type decided upon will be required for each animal.

The next requirement is a half-inch lash rope. This should be at least thirty-three, but preferably forty feet in length. In some respects a cotton rope is preferable to one of hemp, though the latter is more commonly used, and regulations prescribe it for army pack trains.

A good broad cinch should be provided, fitted with a ring on one end to which is attached the lash or lair rope and a cinch hook on the other end.

There should be a pair of hobbles for each animal, and a blind to put upon obstreperous pack animals when slinging and lashing the load. These may be purchased throughout the West at almost any village store. It is well also to carry a bell, which should always be strapped around the neck of one of the horses when the animals are hobbled and turned loose to graze.

It will sometimes be necessary to picket one of the animals, and for this purpose fifty or sixty feet of half or five-eighth inch rope will be required. Also sufficient leading rope should be provided for each pack animal, and a halter rope for the saddle horse. A lariat carried upon the saddle pommel will be found useful in a dozen ways, and may be utilized for picketing horses.

SADDLE AND PACK EQUIPMENT 63

All horses should be "slick" shod; that is, shod with uncalked shoes. The shoes should be of soft iron, not so light as to render them liable to bend before they are worn out, and they should not extend beyond the hoof at side or rear. Some extra shoes of proper size for each animal, a horseshoer's nippers, rasp, hammer and some nails should be included in the equipment.

CHAPTER IX

PERSONAL OUTFIT FOR THE SADDLE

THE outfit recommended in Chapters III and IV in discussing camp and personal equipment for canoe trips is, with the modifications and additions which we shall now consider, equally well adapted to saddle and pack horse travel. As previously stated, our object is to describe methods of packing, rather than to formulate an infallible check list. With this in view an efficient outfit that may be easily packed and transported is outlined, in a general way, and therefore such articles of outfit mentioned in previous chapters as are obviously useful only in canoe travel will not be referred to in this connection.

The wedge, the Hudson Bay, the forest ranger and the lean-to tent are all good models for pack animal travel, and easily erected. Whichever type is chosen, if made of any one of the light-weight materials described, will be found both satisfactory and easily packed. For example, a forest ranger's tent eight feet deep

and eight feet wide weighs less than four pounds, while a lean-to with approximately the same floor space weighs about three pounds. In the more arid regions of the West one rarely finds it necessary to pitch a tent, though it is handy to have one along and well worth carrying, particularly should it be desired to remain more than one night at any point.

During the summer, save in high altitudes, one pair of light woolen blankets will be found ample bedding. For all probable conditions of weather, however, in tent or in the open, the sleeping bag is the most convenient and at the same time the most comfortable camp bed yet devised, and it is so easily carried on the pack horse that I advise its adoption. One made of close-woven waterproofed canvas is the most thoroughly practical bag for general use. This should be lined with two pairs of light blankets, that four thicknesses of blanket may be available for covering. The blankets should be so arranged that they may be taken out and the bag turned for airing. One may adapt such a bag to the temperature, using as many or as few thicknesses of blanket as desired, depending upon the number with which the bag is lined. I recently saw a bag lined with four thicknesses of llama wool duffel (providing two thicknesses for cover) that

weighed but eight pounds and furnished ample protection for any weather down to a zero temperature.

Pack cloths or light tarpaulins 6 x 7 feet, used to cover and protect the packs, will be needed for each pack animal, and at night the bed may be spread upon them. Saddle bags make excellent pillows.

In traveling in an arid region canteens are a necessity. There should be one large one for each traveler to be carried on the pack horse, and a small one swung upon the saddle horn will be found convenient for ready use.

A folding water bucket of waterproofed canvas should also be included in the outfit.

The aluminum reflecting baker which has been described is far preferable to the Dutch oven—a heavy iron kettle with iron cover—not only because it weighs far less and is much more easily packed, but because it is more practical. Westerners are wedded to the Dutch oven, and this reference is merely made as a suggestion in case the question of choice between the two should arise.

If kyacks or alforjas are used the large water-proofed canvas duffle bags and food bags will not be required. The smaller balloon silk or musline food bags, however, will be found fully as convenient in packing in the pack horse

kyack as in the canvas bags on the canoe trip.

Each rider should be provided with either a saddle slicker or a poncho, which when not in use may be rolled and secured to the saddle directly behind the seat by means of tie strings attached to the saddle. A poncho is preferable to a slicker, because of the many uses to which it may be put.

On saddle journeys in cold, windy weather a wind-proof canvas coat or a large, roomy buckskin shirt is a comfort. If a buckskin shirt is adapted, have it made plain without fringe or frill. Wilderness dwellers formerly fringed their buckskin shirts, not alone for ornament, but to facilitate the drying of the garment when wet. In the fringed shirt water, instead of settling around the bottom of the shirt, around the yoke and the seams of the sleeve, will drain to the fringe which the wind quickly dries. In our case, however, the poncho will protect the shirt from a wetting.

In summer, in an arid or desert region of the Southwest, athletic summer underwear will be found entirely satisfactory. Whether this or light wool is to be worn, however, will depend entirely upon the season and the region to be visited.

In very warm weather a close-woven, good quality khaki outer shirt is both comfortable

and practical; but on chilly autumn days a flannel shirt should take its place—gray, brown, blue—the color does not matter so long as it does not crock. It is my custom to have one khaki and one flannel shirt in my outfit.

Trousers should be of heavy khaki, medium weight moleskin, or other strong close-woven material. Full-length trousers, with reinforced seat, are preferable in some respects to riding breeches, and may be worn with the regulation United States cavalry puttee leggings with shoes.

Some riders prefer top boots, such as Arizona cowboys wear, and but for their high heels which make walking uncomfortable they would be admirable. High-laced, medium-weight mountaineering shoes will eliminate the necessity of puttees, and many prefer them to low-laced shoes and puttees. In snowy, cold weather I have found heavy German socks and ordinary shoes, large enough to avoid the possibility of pinching the feet, admirable footwear for the saddle. But whatever is decided upon, extra trousers, extra leggings and extra shoes are superfluous. One pair of each—the pair worn—is sufficient.

The hat should be of the Western style, with broad brim, and of the best grade. The brims of the cheaper ones are sure to sag after a lit-

tle wear and exposure to a shower or two. A good reliable hat may be had for five dollars that will stand several years of hard wear and may be renovated when soiled, assuming again the freshness of a new hat. I have one for which I paid fourteen pesos in Monterey, Mexico, in 1907. I have worn it pretty steadily since in camp and on the trail. It has been twice renovated, and to-day so nearly resembles a new hat that I am not ashamed to wear it about town.

Heavy gauntlet buckskin gloves are a necessary protection, not only against cold in frosty weather, but against brush in summer. The regulation United States cavalry glove is the best that I have discovered for all-around hard usage, and will not harden after a wetting.

The saddle rifle should be short and light—not over twenty-four-inch barrel, and not above seven pounds in weight. A revolver is never needed, though for target practice one offers a means of amusement.

Unless going into permanent camp or into an isolated region, it will hardly be found necessary to start out with more than one week's provisions. Before these are consumed settlements will be reached, where fresh supplies may be purchased. It is well to have along a few cans of baked beans and corned or roast

beef, that a hasty meal may be prepared when time does not allow a sufficient halt to permit the preparation of uncooked foods. Two or three dozen lemons should also be provided, particularly in summer, and in more or less arid regions.

Provisions and general outfit should be neatly packed in small bags, and evenly distributed in the kyacks.

CHAPTER X

ADJUSTING THE PACK

IN saddling up, be sure that the saddle blanket is folded large enough to protect the horse's sides from the pack, when the pack is slung into place. Otherwise the kyacks or alforjas will be liable with constant chafing when the horse is in motion to cause sores. Not only where the saddle rests upon the blanket but where the pack rests upon the horse's sides there should be sufficient thicknesses of blanket to overcome friction, and this demands a greater thickness than under the riding saddle, for the pack load is a dead load. After the pack saddle is thrown into place, and before cinching it, ease the blanket by pulling it up slightly under the center of the saddle—along the backbone of the animal. This will overcome the tendency of the blanket to draw down and bind the horse's back too tightly when the saddle is cinched and the pack in place.

When packing the kyacks or alforjas particular care should be taken to have the pair

for each horse evenly balanced as to weight. If the load swung on one side of the horse is heavier than that on the opposite side, there will be a continual drawing down of the pack saddle on the heavier side, resulting almost certainly in injury to the animal. Inattention or willful carelessness on the part of packers in balancing the pack is five times out of six the cause which leads to sore-backed pack animals.

If two or more pack animals are used, let such provisions and utensils as are in constant use and will be needed at once by the cook, be packed on one animal. Hobbles and bell should also be carried on this animal. This will be the first animal unpacked, and while the other animals are being unpacked the cook may get busy, and the packer will have hobbles and bell at hand to immediately attach to the animals.

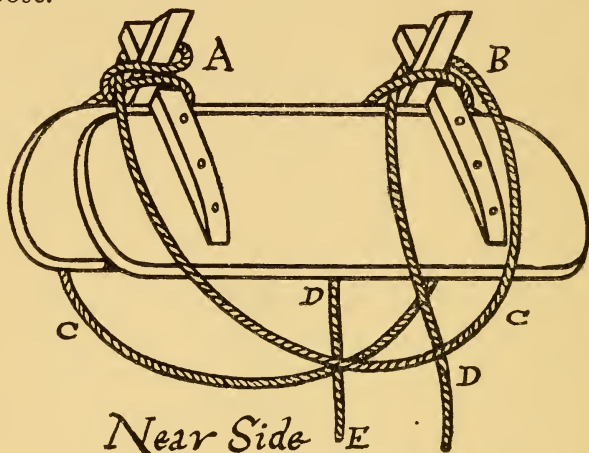
Attached to each end of the kyacks and alforjas is a leathern loop or sling strap. By means of these loops kyacks and alforjas are hung to the saddle, one loop fitting over the forward, the other over the rear cruz, or fork. The kyacks should be so adjusted as to hang evenly one with the other. That is to say, one kyack should hang no lower upon the animal's side than the other, and both should hang as high as possible.

The kyacks in place, hobbles, bell, and such odds and ends as it may not be convenient to pack in the kyack, may be laid on the center between the crosstrees and on top of the kyack, and over all smoothly folded blankets, sleeping bags, or tent, care being exercised to keep the pack as low and smooth as possible. Everything carefully placed and adjusted, cover the pack with the pack cloth or tarpaulin, folded to proper size to protect the whole pack, but with no loose ends extending beyond it to catch upon brush or other obstructions. If inconvenient to include within the pack, the cooking outfit in its canvas case may be lashed to the top of pack after the final hitch has been tied. All is ready now for the hitch that is to bind the pack into place.

Frequently the traveler is not provided with either kyacks or alforjas, and it becomes necessary to pack the load without the convenience of these receptacles. Before considering the hitches, therefore, let us describe methods of slinging the load in such cases upon the crosstree saddle.

The load which is to be slung from the crosstree should be arranged in two compact packages of equal weight, one for each side of the animal. Boxes may be used, but large, strong sacks are preferable. The large can-

vas duffle bags, described in the chapter on canoe outfitting, are well adapted to the purpose.



SLING FOR PACKING ON CROSSTREE SADDLE

A is forward cruz, B rear cruz of saddle. CC are loops which support packages. D and E are ends or hauling parts of rope.

Take the sling rope, and, standing on the near side, throw one end over the horse's neck just forward of the saddle. Now at about the middle of the rope form two half hitches, or a clove hitch, on the forward cruz or fork of the saddle.

With the free end of the rope on the near side form a half hitch on the rear cruz, allowing sufficient loop between the forward and rear cruz to receive the side pack, with the

free end of the rope falling under the loop. Now go to the off side and arrange the rope on that side in similar manner.

Lift the offside pack into position with its forward end even with the forward fork, lifting the pack well up to the forks. Hold the pack in position with the palm of the right hand against the center of the pack, and with the left hand pass the loop along the lower side of the pack, drawing in the slack with the free end of the rope, which passes around the rear fork and under the center of the pack. With the pack drawn snugly in position, take a turn with the free end of the rope around the rope along the side of the pack. This will hold the pack in position. Tie a bowline knot in the end of rope, and at proper length for the bowline loop to reach the center and top of pack. Place loop where it may be easily reached from the near side.

Now pass to the near side and sling the near pack in exactly similar manner, save that no bowline knot is to be formed. Reach up and slip the end of the near rope, which you are holding, through the bowline loop, draw tight and tie.

The following is another method of slinging packs, frequently used by forest rangers:

Throw the rope across the horse directly in

front of the saddle, and as in the previous method form two half hitches with the rope at its middle on the front fork, but in this case permitting the ends to lie on the ground on either side the horse. Place the near pack in position and against the lower rope, and holding it with one hand, bring the rope up and over the pack with the other hand and throw a half hitch around the forward fork, keeping the free end of the rope under. Draw the rope taut, lifting the pack well up. Pass the running rope back and throw a half hitch around the rear fork, the loose or running end of the rope on the under side, as when forming the half hitch on the front fork. Now pass the running rope from under over the pack at the rear, throw a half hitch over the rear fork, take up all slack, bring the loose end under and around the two ropes at their intersection between pack and rear fork, and tie securely. The pack on off side is slung in similar manner.

Most mules, and not infrequently horses as well, have a constitutional dislike to receiving the pack. If your pack animal displays any such tendency adjust the blind over his eyes and let it remain there until the hitch is thrown and the load tightened and secured. The blind is usually an effective quieter.

CHAPTER XI

SOME PRACTICAL HITCHES

WHETHER the load is made up with kyacks, alforjas, or separate packs slung to the crosstree saddle as described in the preceding chapter it must be secured in place. For this purpose various hitches are employed by packers, each hitch well adapted to the particular conditions which evolved it.

Our description will be confined to the following six hitches, which furnish ample variety to suit the exigencies of ordinary circumstances:

(1) The crosstree or squaw hitch, which is the father of all hitches because from it the diamond, the double diamond and all pack-train hitches in present-day use were evolved.

(2) A diamond hitch, adapted to the crosstree pack saddle. This is a form of single diamond.

(3) The United States army diamond particularly adapted for use with the aparejo. The true double diamond is a hitch rarely called for

save in army work or freighting pack trains, and will therefore be omitted. There are several so-called double diamonds that might be described, but these near-double diamonds possess little or no advantage over the single diamond, and we shall pass them over as they are scarcely resorted to in ordinary pack work.

(4) The one-man or lifting hitch.

(5) The stirrup hitch, to be used when the packer has rope but no cinch.

(6) The saddle hitch, employed in slinging loads upon an ordinary riding saddle.

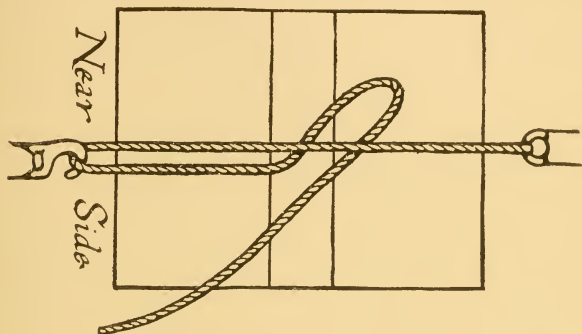
(7) The hitch for packing a sick or injured man.

THE CROSSTREE HITCH

This hitch was introduced into the Northwest by the early fur traders and adopted by the Indians. Among Indians, women are the laborers, and the crosstree hitch being the hitch almost exclusively employed by the squaws was presently dubbed by white men the "squaw hitch." It is a hitch very generally used by prospectors, and for this reason is known in some localities as the "prospector's hitch." In other sections of the West, where sheep herders commonly use it, it is locally called the "sheep herder's hitch." It is a hitch

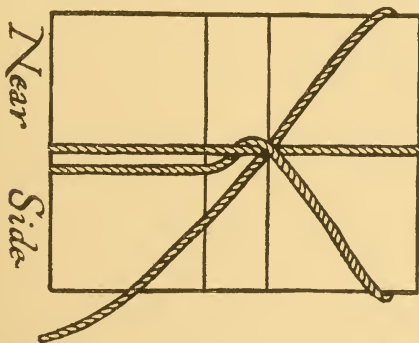
easily thrown by one man, holds well, and is therefore a favorite.

With lash rope attached to cinch, take a



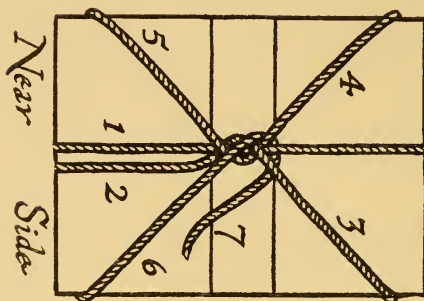
SQUAW OR CROSSTREE HITCH

(FIG. 1.) Rope engaged on cinch hook and bight of rope running from rear forward under standing rope.



(FIG. 2.) Loop of bight enlarged, reversed and passed around bottom and lower corners of off side pack.

position on the near side of the animal facing the pack. Throw the cinch over the top and



(FIG. 3). Hitch formed and ready to tighten. 1. Standing rope. 2. Running rope. 3. Rear rope—off side. 4. Front rope—off side. 5. Front rope—near side. 6. Rear rope—near side. 7. Marker.

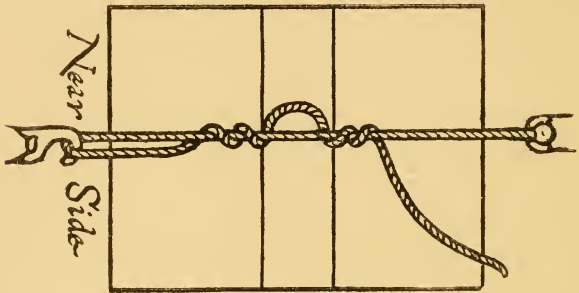
center of pack in such manner as to be easily reached under the horse's belly. Pick up cinch and engage the rope from in out upon the hook. Draw up slack, taking care that the cinch rests properly upon the horse's belly. Grasp the running and standing rope in left hand above the hook, to hold slack, and with the right hand double the running rope and thrust the doubled portion under the standing rope from rear forward in a bight, at top of pack. Enlarge the loop of the bight by drawing through enough slack rope to make the loop of sufficient size to be passed over and around the off side kyack or pack. Step to off side, turn loop over, and engage it around the ends and bottom of kyack, from front to rear. Re-

turn to near side, and pass the loose end of running rope around the forward end, bottom and finally rear end of kyack. Draw the rope end, from above down, over and under the standing rear and running ropes, at the top and center of the load, and the hitch is ready to tighten.

To tighten the hitch, grasp the running rope a little above the cinch hook, and pull with all your strength, taking up every inch of slack possible. Retain this slack by holding the standing and running rope together with left hand, while with the right hand you reach to top of load and pull up slack where running rope passes under standing rope. Go to off side and draw in all slack, following the rope around off side pack. Retaining slack, return to near side, and still following rope and taking up slack around front to rear of near side pack, grasp end of rope, already engaged as directed over and under standing rear and running rope, pull hard, bracing a foot against pack, and tie. Two men, one on each side of the horse, can, of course, throw the hitch and tighten the load much more quickly than one. Tightening the load is just as important a feature of packing as evenly balancing the packs. The result of an improperly tightened load will pretty certainly be a sore-backed horse.

THE CROSSTREE DIAMOND HITCH

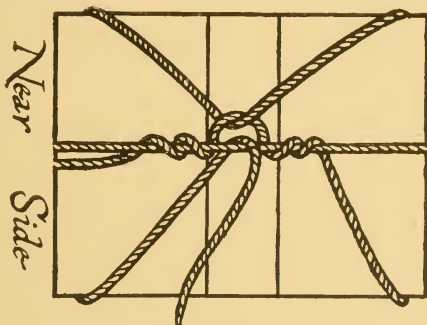
Take position on the near side of horse, as when forming the crosstree hitch, and throw cinch over horse, engaging it on hook and adjusting it in exactly similar manner. Take in



(FIG. 1.) A turn is here taken around standing rope with loop of bight of running rope thrust under standing rope from rear to front, as in Fig. 1, illustrating Squaw Hitch.

slack and retain it by grasping the standing and running ropes in left hand. Double running rope and thrust doubled portion under standing rope in a bight, from rear forward at top and center of load. Take up all slack. Enlarge loop of bight by drawing through enough running rope to form a diamond of sufficient size to hold top of load. Now bring center of loop over and under standing rope, from rear forward, thus giving rope at each

side of loop a complete turn around standing rope. Throw the disengaged portion of running rope to off side of horse, and passing to the off side, bringing the rope down along rear, bottom, and up front of kyack, thrust loose rope end up through loop at top of pack. Take in slack and return to near side of horse. Engage running rope around front, bottom and rear end of near side kyack or pack, and thrust



CROSSTREE DIAMOND HITCH

(FIG. 2.) Hitch formed ready to tighten.

rope end over and under standing rope opposite center of loop. Take up slack and load in ready to tighten.

Tighten load by grasping running rope above hook and drawing as tight as possible. Hold slack with left hand, gripping running and standing rope, and take up slack at loop with right hand. Pass to off side and take up slack

and tighten rear to front around kyack. Pass to near side, tightening front to rear; finally, bracing a foot against the load pull on loose end, and retaining all slack make final tie.

The above described "diamond" hitch is not the true diamond employed by government pack trains where the aparejo is used, but it is a diamond evolved from the crosstree hitch, and is particularly well adapted to the crosstree or sawbuck pack saddle, is easily formed, and holds the load securely, which is the ultimate object of all hitches.

THE UNITED STATES ARMY DIAMOND HITCH

The single diamond hitch employed by army packers is the ideal hitch for securing a load upon an aparejo. This is a two-man hitch, though an expert can throw it alone.

One packer takes his position on the off side of the animal, while the other with the coiled lash rope, cinch attached, remains on the near side.

The near packer, retaining the cinch, throws the coiled rope over the horse's haunch, to rear. The off packer picks up end of rope, and receiving the hook end of cinch, passed to him under horse's belly by near packer, holds it

UNITED STATES ARMY DIAMOND HITCH

Figures represent successive stages in formation. Near side towards right in each case. Line PP in Fig. 1 represents horse's back, AA (Fig 3) standing part of rope, and A₁ (Fig. 2) the running rope.

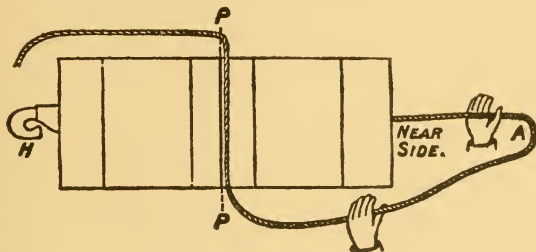


FIG. 1.

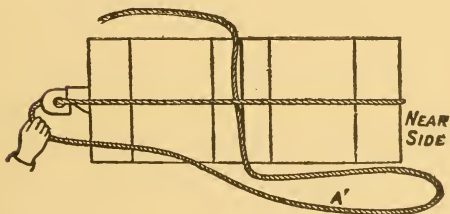


FIG. 2.

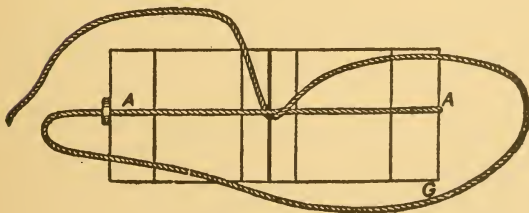


FIG. 3.

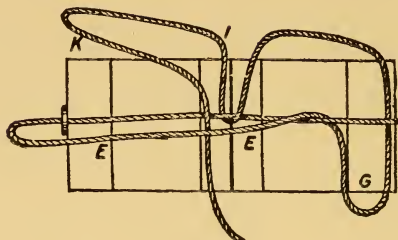


FIG. 4.

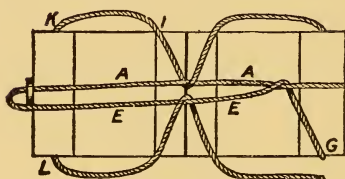


FIG. 5.

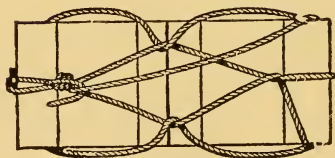


FIG. 6.

together with end of rope in his left hand, and stands erect.

The near packer, taking a position at the horse's neck, grasps the rope about six feet from cinch, and with an upward and backward motion, drops it between the two packs, one slung on either side of the aparejo.

Still grasping the rope in his right hand just forward of the packs at the top, he pulls forward between the packs sufficient running rope to permit him to bring his hand down to his side. Retaining the rope in his right hand he now reaches up with his left hand, and with back of hand up and thumb under grasps running rope and draws sufficient rope forward to permit the left hand grasping the rope to come down to his side, arm's length.

With the right elbow crooked the right hand, still holding the rope, is brought up about on a level with the chin, and the left hand, also retaining its hold on the rope, thumb down, is raised to hollow of the right arm, with loop of rope between the hands lying outside the right arm. Now by a single swinging motion with both hands the rope in the right hand, called the "standing rope," is thrown over the center of pack to the off packer who stands ready to receive it; and the rope held in the left hand, called the "running rope," over the horse's neck, forward of the pack.

The off packer, still standing with cinch hook and end of rope in left hand, with his right hand grasps the standing rope as it comes over as high up as he can conveniently reach, draws it down, and holding the cinch hook in proper

position below the aparejo draws down the standing rope and engages it upon the hook from in out.

The near packer now draws forward between the packs about six feet more rope, which he throws to the rear of the near side pack. This rope is now called the "rear" rope. He next grasps the running rope at the horse's neck, and with the off packer's assistance releases that portion of the running rope lying between the packs forward of the standing rope, and brings it to the center of pack on near side, next to and just back of the standing rope.

He now slips his right hand down the rope to a point half way between pack and aparejo boot, and with the left hand reaches from forward between standing rope and aparejo and grasps the rope just above the right hand. Both hands are now slipped down the rope, and with the same motion drawn apart, one on each side of standing rope (under which the rope being manipulated passes) to the cinches. With the hands about ten inches apart, the section of rope between them, which is held in a horizontal position, is jammed down between the two cinches under the aparejo.

The off packer, holding the running rope with his right hand above the hook, places the left hand holding end of rope on top of running

rope between his right hand and the hook, and with thumb under running rope grasps both ropes and slips his hands up on running rope, bringing it to center of load.

He now draws the end of the rope, held by left hand, forward until a foot or so falls upon the near side of the horse's neck. The hitch is now formed, ready to tighten.

To tighten, the near packer with his left palm passing the side and center of the pack grasps the running rope at the rear of the standing rope, at the same time bringing the running rope between the thumb and index finger of the left hand, which he is using as a brace. In this position he is prepared to hold slack as it is given him by the off packer.

The off packer grasps the running rope close down to the hook, and, bracing himself with a knee against the aparejo boot, pulls with all his might, taking two or more pulls, if necessary, and giving slack to near packer, until no more slack can be taken on standing rope. He now steps smartly to rear and throws the top rope forward of the pack. The top rope is the rope leading up from the rear corner of the aparejo boot on near side to the side and center of off side pack. After it is thrown forward it is called the "front" rope. He now prepares to receive slack from near packer by grasping the

rear rope where it lies between the packs.

The near packer, who has been receiving the slack given him by the off packer, carries his right hand, with which he holds the slack at rear of standing rope, to lower side of pack toward the aparejo, and reaches under standing rope, with left hand grasps rope above right hand, drawing it forward under standing rope, and employing both hands jams it upward in a bight between standing rope and pack, Care should be taken during this operation to retain all slack.

The near packer now engages around front boot of aparejo the free portion of the running rope below the bight just formed. Holding slack with left hand, he grasps the rope to rear of cinch in right hand; receiving slack from left hand he brings rope to rear of aparejo boot, and with both hands carries rope smartly to upper corner of side pack, always retaining slack. The off packer receives slack, pulling it in quickly hand over hand, the near packer retaining his hold until the off packer has the rope taut. The near packer now takes a position at the forward end of load, facing the rear, and grasps end of rope prepared to take slack from off packer.

The off packer, after receiving slack from near packer as described takes a turn of the

rope around each hand, holding every inch of slack, steps to the rear, keeping in line with the horse's body, and then facing forward throws his full weight back upon the rope. Retaining the slack with his left hand, with his right hand he brings the free portion of running rope under and around the aparejo boot, from rear to front, passes forward of rope, and facing the rear and grasping rope, right hand above the left, brings it smartly to upper corner of pack.

The near packer, holding end of rope, immediately draws in slack until he has about six feet of free rope, which he throws over center of load to off side, and then drawing in all remaining slack takes a turn of rope around each hand and throws his weight upon it, and the off packer releases his hold.

Holding the slack with the left hand, the near packer releases his right hand and with it engages the free or running portion of rope under and around the aparejo boot to rear of load, while the off packer steps to rear of load, takes end of rope, and while he draws in all slack, neatly coils rope, holding coil in right hand at lower side of pack, and, with palm of left hand braced against center of load, receives slack from near packer.

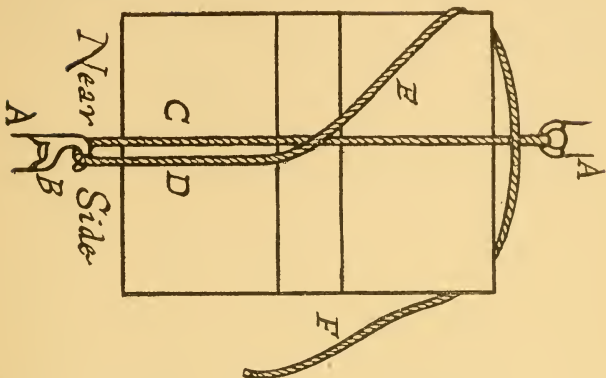
Grasping in his left hand the taut rope above

the coils, and lifting it sufficiently above the load to admit the coiled rope under it, he swings the coils with his right hand from rear to front to top of load and brings the standing rope held in his left hand down on top of the coils to hold them. He now takes a loop of the rope, forces it between standing rope and pack, in a bight, and takes a turn of the loop around standing and running rope to secure it, first joining the loop well up, and the hitch is tightened.

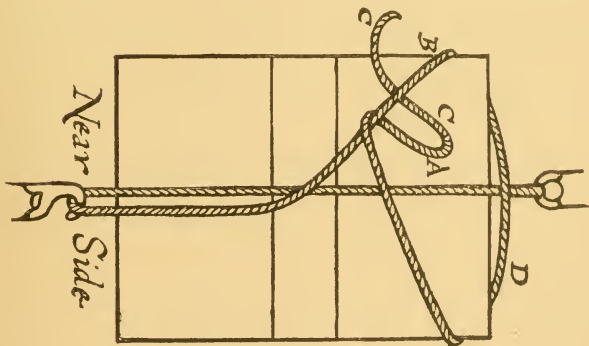
THE ONE-MAN OR LIFTING HITCH

This is a pretty good hitch sometimes where kyacks are not used and an irregular pack is swung upon the crosstree. While it holds the pack very securely to the animal's back, its tendency is to lift the corners that might cause friction upon the horse's sides.

Standing on the near side of the horse, throw cinch over the horse's back, pick up cinch and engage rope upon cinch hook, from in out, as in previous hitches. Take up slack, bring running rope up side of pack, double and thrust loop or bight under standing rope from rear forward at top of pack, to hold slack. Throw all loose rope to off side, and pass around to off side yourself.



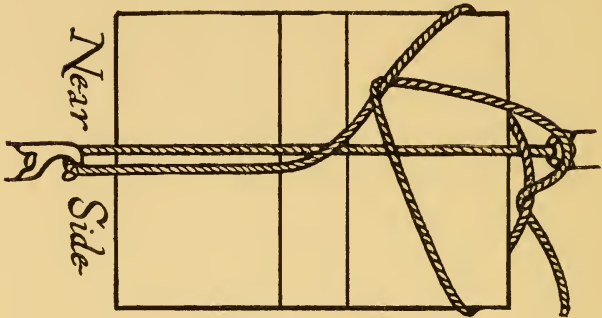
(FIG. 1.) A—Cinch D—Running rope
 C—Standing rope E—Front rope
 B—Cinch hook F—Marker



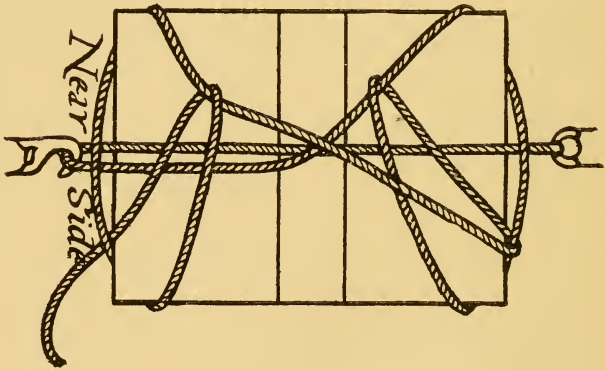
LIFTING HITCH

(FIG. 2.) Grasp loop A in left hand and with right jam rope C C along and under rope B (where latter passes beneath corner of pack) to D, as shown in Fig. 3.

Draw loose end of running rope forward and



(FIG. 3.) Off side of hitch completed.



LIFTING HITCH

(FIG. 4.) Hitch formed ready to tighten.

from under standing rope at top of pack. The effect of operations thus far is this: The running rope passes up the near side, from hook and to top of load and passes under standing rope, which will serve effectually in final tightening of cinch to hold slack.

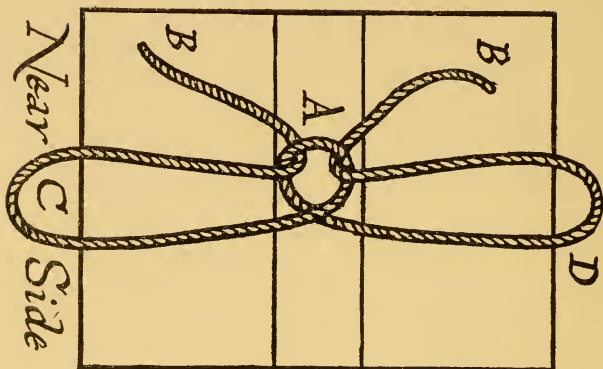
Pass end of running rope over and under the forward end of off pack and backward under standing rope and pack. Now bring the rope forward over side of pack, double, and thrust the doubled portion over and under forward rope in a bight. With left hand grasp double of rope at bight just to rear of forward rope where it passes over and under forward rope, and with right hand slip running rope down and just to rear of standing rope. Take up slack. By pulling hard upon loose end of running rope the ends of pack will be lifted slightly.

Throw loose end over horse to near side, and across middle of load. Pass to near side and manipulate rope as on off side. Tighten load. Secure the hitch by bringing loose end of rope over and under forward running and standing ropes, and tie.

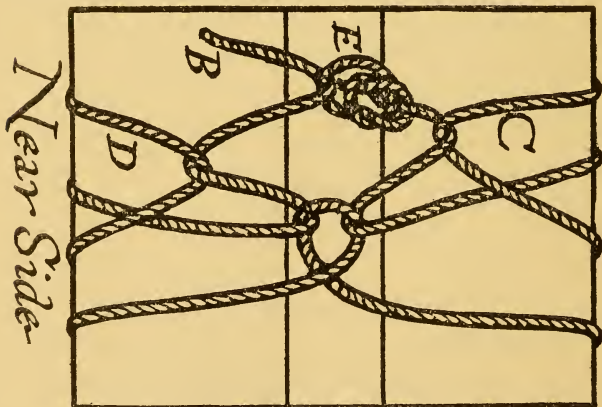
STIRRUP HITCH

This hitch is useful where the packer has lash rope but no cinch, and may be employed on sawbuck saddle, aparejo, or where the load is hung upon an ordinary riding saddle. It is a two-man hitch, though one man may manipulate it.

Pass the rope over the load, with an equal



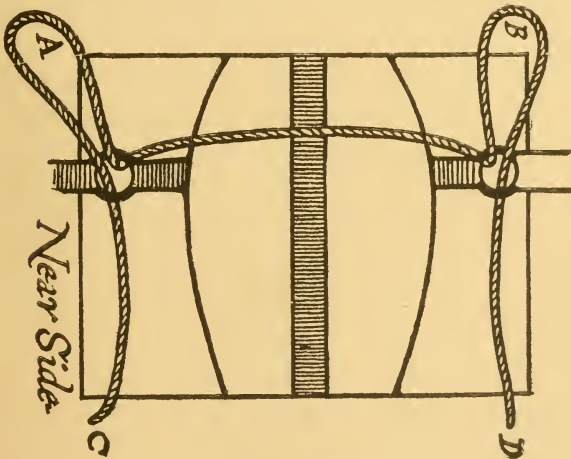
(FIG. 1.) Rope is thrown across load with equal portion falling on each side. Loop A is formed on top of load, and the ends BB are passed through it to form large loops C and D.



STIRRUP HITCH

(FIG. 2.) Loops C and D are passed under horse's belly and seized by packers on opposite sides. Each packer then draws end of rope which he is holding through loop which has been passed to him. Off packer forms bowline knot, E, and near packer passes his end of rope through this. Hitch is now ready to tighten.

division of rope on either side. Form a loop at center and top of load. Each packer will now place a foot upon the rope, where it falls from loop to ground, and pass his end of rope through loop from above down and draw through slack rope. This forms a loop on either side in which the foot rests. Each packer will now bring forward and under the horse's belly the loop in which his foot rests, passing the loop to the other packer at the same time disengaging his foot, and will pass the loose end of rope which he holds through the loop which he receives. The ropes on top of



SADDLE HITCH

With rope arranged as shown throw deer across saddle, enlarge loops A and B around haunches and neck. Bring ends C and D together, form bowline knot on end D, pass end C through it and tighten.

pack will now be spread to properly cover and secure the pack, and all slack taken.

The off side packer now forms a bowline knot in the loose end of his rope, the near side packer passes his loose end through the bowline loop. To tighten the load the off side packer gives slack, while the near side packer braces and draws in on loose end of rope, tying at bowline loop to secure load.

THE SADDLE HITCH

This is a particularly useful hitch when it becomes necessary to sling a deer to a riding saddle for transportation to camp.

Throw the lash rope across the saddle seat, an equal division of rope falling to either side. Double the rope where it crosses the cinch ring and thrust it through the cinch ring in a loop, drawing through enough loose rope to form a good-sized loop. This should be done on both sides. Lay the deer across saddle, with head hanging on one side and haunches on the other side, slip loop on one side over the deer's head, and the loop on the other side over its haunches. Take in all slack. Form a bowline loop on end of off side rope, and lay it on top of load. This loop should be so adjusted as to reach the middle of the top of load.

Passing to near side, thread loose end of near side rope through the bowline loop. Tighten load by pulling on loose end, and tie.

HOW TO PACK A SICK OR INJURED MAN

Sometimes it occurs that a member of a party is so injured or becomes so ill as to be helpless, and the problem of transporting him upon horseback presents itself. This may be done in the following manner upon a crosstree or sawbuck saddle:

Cut two straight sticks three feet long and about three inches in diameter. Fit one on either side of saddle snug against the forks. Lash securely to forks forward and rear, with ends of sticks protruding an equal distance forward of and back of forward and rear forks. It may be well to cut shallow notches in the sticks where they rest against the forks. This will preclude lateral motion.

Cut two sticks two feet long and three inches in diameter. Place one in front and one in rear at right angles to and across top of sticks already in position. These cross-pieces are to be lashed to position one about two inches from forward ends, the other two inches from rear ends of lengthwise sticks. Before lashing them into position cut notches to receive lash

ropes at points of intersection, that any tendency to slip or work loose may be overcome.

Now cut two poles six feet long and three inches in diameter. Spread a pack cloth upon the ground, and presuming the pack cloth is six feet wide, place a pole on each outer end of it. Roll poles, with pack cloth, to center until there is a width of twenty inches between the outer edges of poles. In this position lace cloth to each pole, or if horseshoe or other nails are handy, nail it to poles. Should the cloth be wider than length of poles, fold in a margin on each end, before rolling. Place litter on cross-pieces, the flat of canvas on top. Notch, and secure poles of stretcher at front and rear to cross-pieces. Lash down litter by means of the stirrup hitch.

CHAPTER XII

TRAVELING WITHOUT A PACK HORSE

THE man who travels without a pack horse, and carries his full equipment and provision supply upon his saddle must, of necessity, deny himself many things that under ordinary circumstances are deemed essentials. He must indeed travel light, and unless he is well inured to roughing it will be content to confine his activities to the warmer and less inclement months.

The food supply is the first consideration, but nowadays one is certain to come every three or four days at the outside upon some point where fresh supplies may be purchased. Therefore, twelve to fifteen pounds of provisions, carefully selected from the ration already suggested, will meet the utmost needs. In selecting the ration it is well to eliminate all luxuries. It may also be said that canned goods are too heavy, where one is to pack more than a two-days' supply, and bacon should be made the

basis of the meat diet. But then we are considering methods of packing and carrying, rather than check lists. Limiting the quantity to fifteen pounds for a five-days' trip—and this is ample with judicious selection—the individual will be left to decide his ration for himself.

Saddle bags will be found indispensable and in them will be ample room to carry the limited toilet articles required, a hand towel, one change of light woolen or summer underwear, matches, tobacco and rifle cartridges. The best shelter is a lean-to tent, made of extra light cloth. This should be about seven feet long, four and one-half feet high and four feet deep. Such a tent will weigh about three pounds.

The cooking outfit will be limited to essentials. If it can be had an aluminum army or "Preston" mess kit, either of which weighs about two pounds, a sheath knife with broad blade, and a pint cup, will fill all requirements. If the mess kit cannot be procured, a small frying pan with folding handle, an aluminum or enamel plate and a dessert spoon with sheath knife, and a pint cup, will do nearly as well. In this latter case coffee may be made in the cup. A small canteen, which may be hung upon the saddle horn, should also be provided.

A small belt axe that weighs about two

pounds, with sheath, a lariat and a few feet of rope will be required.

A single blanket or a pair of light blankets not exceeding five pounds in weight will constitute the only bedding that can be conveniently carried.

To pack the outfit spread tent flat upon the ground, turning the triangular ends in to lie flat. Fold the tent once, end for end. This will make a rectangular pack cloth three and one-half feet long and about five and one-half feet wide. Fold your blanket to a size a little smaller than tent and spread it flat upon the tent. Arrange your provision packages on the blanket a foot or so from one end and with a margin of a foot or more on either side. Fold the end of blanket and tent up and over the packages and roll up blanket and tent together with a band close to the knob in center to hold the packages in place and prevent their working down toward ends of roll.

The provisions should be thoroughly protected in bags, as previously suggested, in order that they may not soil the blanket.

Place the roll directly behind saddle seat with the bulge caused by the provision bulk resting against saddle seat, the end of roll falling on either side, and tie in position by means of leather tie strings attached to saddle on each

side. The tie should be made in both cases just below the bulge in roll.

The tent will protect blanket and provisions, and if judgment has been used in the selection and arrangement of provisions the bulk should not be unduly or inconveniently large. The cooking kit, if enclosed in a canvas case with handle, may be lashed to roll by passing lash string through the handle and over the top and around the kit. A strap above the upper loop of the rifle boot and through the belt loop on the axe scabbard will hold the axe and another buckled around the rifle boot and lower end of handle will prevent a slapping motion of the handle.

The poncho, neatly rolled, may be carried on the pommel, the center of the roll pressed against the back of the horn, the ends drawn down and forward of the pommel on either side and secured with the leathern tie strings attached to the saddle. When not in use sweater or Pontiac shirt may be carried with the poncho.

The horse may be picketed with the lariat. Hobbles may be made as cowboys make them from rope. A strand unraveled from half-inch rope brought once around one leg, twisted rather tightly, the ends brought around the other leg and secured in the twist between the

legs, makes a good hobble. Always fasten picket rope or hobble below the fetlock just above the hoof—*never* above the fetlock.

The outfit here outlined will weigh, including rifle and a reasonable amount of ammunition, from forty to forty-five pounds at the utmost, and one may be very comfortable with it. If game and fish can be caught and are to be depended upon, the provisions may be cut down to a little flour, bacon, coffee and sugar, and the traveler may tarry in the wilderness for a considerable time.

One may leave out the tent, and in a warm climate even the blanket, relying for shelter wholly upon the poncho. An experienced man will often limit his cooking outfit to a cup and canteen. A good strong reliable horse, a good saddle equipment, and enough plain food is all one really needs who has experience in wilderness travel. Such a man can make himself comfortable with exceedingly little.

CHAPTER XIII

AFOOT IN SUMMER

ON the portage one may carry a pretty heavy pack and think nothing of it, for the end of the portage and the relaxation of the paddle is just ahead. The portage is merely an incident of the canoe trip.

The foot traveler, however, has no canoe to carry him and his outfit five or ten miles for every mile he carries his outfit. He must carry both himself and his outfit the entire distance traversed. This is obvious, and it leads to the conclusion that the outfit must be accordingly reduced both in weight and bulk.

How heavy a load may be easily transported depends, of course, upon the man, but it is safe to say that the inexperienced will find twenty-five pounds a heavy enough burden, and within this limit must be included shelter, bed, and one week's provisions; though ordinarily the trampler will be able to renew his supply of provisions almost daily.

Under all ordinary circumstances a single

woolen blanket weighing not to exceed three pounds will be found ample summer bedding. A lean-to shelter tent seven feet long, four feet wide and four feet high of one of the light tenting materials previously described, weighs less than three pounds and furnishes ample and comfortable shelter. Blanket and tent may be carried easily in a roll, the tent on the outside to protect the blanket.

To make the roll spread the tent upon the ground, fold the blanket once, end for end, and spread it upon the tent, the sides of the blanket (*not* folded ends) toward the ends of the tent. Fold in ends of tent over blanket and roll up. Double the roll and tie together a little above the ends with a stout string. The roll, dropped over the head with center resting upon one shoulder and the tied ends coming together near the hip on the opposite side, may be carried with little inconvenience. Blankets are usually seventy-two inches wide, therefore the roll should be about six feet in length before it is doubled and the ends tied.

A belt axe will be carried, in a sheath, upon the belt, the remaining equipment and provisions in a Nessmuk pack or a ruck sack. The Nessmuk pack, sold by most outfitters, is about 12 x 20 x 5 inches in size and made of water-proofed canvas. This will easily hold a nine-

inch frying pan with folding handle, an aluminum pan 7 x 3 inches with folding handle, a pint cup (if you do not wish to carry the cup on your belt), a spoon or two, a cooking knife, a dish cloth and a dish towel, together with one week's provisions, matches, etc. There will still be room for a small bag containing the few needed toilet articles and hand towel, and another small bag containing one change of light-weight woolen underwear and two pairs of socks.

The cooking outfit indicated is limited, but quite ample. I have done very well for weeks at a time with no other cooking utensils than a pint cup and a sheath knife. But here we cannot go into woodcraft or extreme concentration of rations and outfit. We are considering, rather, comfortable or moderately comfortable outfits and how to pack or transport them.

Tent, blanket, axe, food and other equipment above suggested will, if intelligently selected, not go beyond the twenty-five pound limit. The greatest weight will be in the food, and each day will reduce this about two pounds. If provisions can be purchased from day to day these, of course, need not be carried, and the remaining load will be very light indeed.

I would suggest that a light sweater take the

place of a coat as it will be found more comfortable and useful and may be carried on top of the pack or in the blanket roll, for it will rarely be worn save in the evening camp.

A broad-brimmed felt hat, an outer shirt of medium-weight flannel, khaki trousers and strong but not too heavy shoes make a practical and comfortable costume. Woolen socks protect the feet from chafing. Some campers like long German stockings, which serve also for leggings, and wear thin cotton socks inside them. In selecting shoes take into consideration the kind of socks or stockings to be worn, and see that the shoes are amply large though not too large, for shoes too large are nearly as uncomfortable as shoes too small.

CHAPTER XIV

WITH SNOWSHOES AND TOBOGGAN

IN the mode of travel here to be considered the voyageur, equipped with snowshoes, hauls his provisions and entire camping paraphernalia upon a toboggan or flat sled. The toboggan (Indian ta'-bas-kan') had its origin in the prehistoric past among the Algonquin Indians of northeastern America. It was designed by them for the purpose of transporting goods over trackless, unbeaten snow wastes where sleds with runners could not be used, and for this purpose it is unequaled.

While for our purpose the conventionalized toboggan sold by outfitters and designed for hill sliding and general sport will answer very well, the wilderness model in use by Indians and trappers in our northern wilderness is a better designed and preferable type for the transportation of loads.

Various lengths of toboggans are in use, each intended for the particular purpose for which it was built. The longest Indian tobog-

gan I ever saw was twelve feet in length, but from six to eight feet is the ordinary length, with a width of nine inches at the tip of the curved nose, gradually increasing to fourteen inches wide where the curve ends and the sliding surface or bottom begins, and tapering away to about six inches wide at the heel. The conventionalized type averages from four to six feet in length with a uniform width of about fifteen inches from curve to heel.

Some three or more crossbars, depending upon the length of the toboggan, are lashed at intervals across the top, the forward one at the beginning of the curve where the nose begins to turn upward, and on either side of the toboggan from front to rear side bar, and fastened to the side bars at their ends are side ropes.

Beaver-tail, bear's-paw, or swallow-tail snowshoes, of Indian make, are the shapes best adapted to the sort of travel we are considering. These models are all broad and comparatively short. The web should be of good caribou babiche, closely woven for use upon dry snow, and indeed for all-around conditions. While on wet, soggy snow a coarse web may in some respects be preferable it will not compare in efficiency with the close web on loose snow, or for all-around work under all sorts

of conditions. Long, narrow snowshoes may be very good for racing where the country is smooth, but they are not suited to a rough, wooded or broken country or to hummocky snow.

The best and most practical, as well as the simplest sling or binding for the snowshoe is made as follows: Cut from an Indian tanned buckskin a thong about half an inch wide and thirty inches in length. Thread one end of this, from above down, through the web at one side of the toe hole, and from the bottom up at the opposite side. Pull it through until the two ends are even. Draw the thong up at the middle, where it crosses the toe hole, to make a loop large enough to admit the toe under it, but not large enough to permit the toe to slide forward against the forward cross-bar. Wrap the two ends of the thong around center of loop two or three times bringing them forward over the top and drawing them under and back through the loop. Slip your toes under the loop, bring the ends of the thong back, one on either side of the foot, and tie snugly in the hollow above your heel.

This sling will hold well, will not chafe the foot, and with it the snowshoe may be kicked free from the foot or adjusted to the foot in an instant.

Should the thongs stretch in moist weather, the sling may be tightened by simply taking an additional turn or two (without untying) around the toe loop.

I believe that lamp-wicking would answer as well as buckskin thongs, though I have never used it because I have always carried an ample supply of buckskin.

The best underclothing for the winter trail is good weight—though not the heaviest—woolen. Two suits should be carried besides the suit worn. Underclothing should not fit the body too snugly. It is better that it should be a size too large than an exact fit.

The outer shirt should be of flannel, and of good quality, though not too heavy.

Hudson's Bay Company trappers wear good-weight moleskin trousers, almost entirely to the exclusion of other fabrics, and I adopted them several years ago as superior to any other. They are wind-proof and warm and are particularly well adapted to the rough work of the trail.

The ordinary coat is not at all adapted to the northern wilderness in winter, for it will not protect against drifting snow and driving blizzard. In its stead the Eskimo adickey should be worn.

Any seamstress who can cut and make an

ordinary work shirt can make an adickey if your outfitter cannot supply it. This garment is slipped on over the head like a shirt, and has a hood attached to draw over the cap as a neck and head protection. The neck opening is large enough to permit the head to pass through it without the necessity of a buttoned opening in front, for no matter how closely buttoned a garment may be drifting snow will find its way in. In length the adickey reaches half way between hip and knees and is made circular at the bottom. The hood should be of ample proportion to pull over the cap loosely, with a drawstring encircling the front by which it may be drawn snugly to the face. A fringe of muskrat or other fur around the face increases the comfort, the fur acting as a protection against drifting snow. While white Hudson's Bay Company kersey cloth is a favorite fabric for this garment, it may be made of any woolen blanket duffle or similar cloth.

Over the kersey adickey another adickey of some smooth-surfaced, strong material, preferably moleskin, should be worn. This outside adickey should of course be just enough larger than the kersey or blanket adickey to fit over it easily. The adickeys may be worn singly or together, according to the demands of the weather.

A Pontiac shirt, to be worn under the adickeys in extremely cold weather, should be included in the outfit. This will serve, too, in camp, when the adickeys are laid aside.

A round cap of fur or heavy cloth provided with flaps to turn down over the ears makes the best head protection. The hoods of the two adickeys, as before stated, should be large enough to draw over this.

Very important indeed is the question of foot dress. Not only must we aim to secure the greatest possible freedom and ease in walking, but the ever-present danger of frostbite must also be guarded against.

Socks should be of wool, of the home-knit variety, and besides the pair worn, three or four extra pairs should be carried in the kit.

Knit socks will not be sufficient protection, however, and where two or three pairs are worn they are certain to bunch or wrinkle, with chafed and sore feet as a result. All Hudson's Bay Company stores keep in stock a white fuzzy woolen duffle of blanket thickness. If you are making your start from a Post purchase some of this duffle and have one of the women at the Post make you a pair of knee-length stockings of the duffle to pull over your knit socks, and two pairs of slippers of the same material, one just large enough to fit

over the foot of the long stockings, the other just a little larger to fit over all. These should be made of proper size, to obviate wrinkles. The larger outfitters carry in stock good wool duffle, and will make these to fit properly.

In crisp, cold weather, when the snow never softens or gets moist even under the midday sun, buckskin moccasins should be the outer footwear. Ordinary leather will freeze stiff, stop the proper circulation of blood, and certainly lead to frosted feet. The moccasins should be made with high tops, reaching above the ankles, with buckskin strings to wrap around and secure them. Moccasins are light to pack, and it is always well to carry a couple of extra pairs, to have on hand in case of emergency.

Leggings of moleskin (or some other strong, pliable cloth) large enough to push the foot through protect the legs. These should be knee high, with a drawstring to secure them just below the knee. Ordinary canvas leggings will not do. The leggings *must* be made in one piece, without side buttons or other fastenings, for otherwise snow will work through to the great discomfort of the wearer.

I have a pair of buckskin moccasins sewn to legs of harbor sealskin, the hair side of the sealskin out. This arrangement is preferable

to separate leggings but sealskin legs are difficult to procure.

Ordinarily I have found one pair of knit socks, one pair of the long duffle stockings described above and one pair of the duffle slippers, worn inside the buckskin moccasins, quite sufficient.

The knit socks may be done away with entirely and also one pair of duffle slippers if rabbit-skin socks are to be had. These are worn with the hair next the foot, and are very warm and soft.

In weather when the snow softens and becomes wet at midday, buckskin moccasins will not do, for the least moisture penetrates buckskin. In such weather sealskin boots are the best foot protection. They are waterproof, pliable and light. Sealskin boots for this purpose have neither soles nor heels. They are simply sealskin moccasins with legs, secured with drawstrings below the knee. These are of Eskimo make, and not generally obtainable though they may be purchased in Newfoundland. Oil-tanned moccasins, or larrigans, are the next best moist-snow foot gear.

Buckskin mittens with one or two inner pairs of mittens of thick wool duffle, will protect the hands in the coldest weather. One pair should be a little smaller than the other, that it may

fit snugly into the larger pair without wrinkles, and the larger pair of a size to fit in the same manner into the buckskin mittens. When the weather is too warm for both pairs, one pair may be removed. A fringe of muskrat or other fur around the wrists of the buckskin mittens protects the wrists from drifting snow.

A pad of rabbit-skin worn across the forehead will protect it from intense cold. Hunting hoods of knit camel's hair worsted are a pretty good head protection, particularly at night. They cover the whole head except the face, and may be drawn up over the chin. Mouth and nose must not be covered, or the breath will quickly form a mass of ice upon the face.

One caution, though it may seem a digression, may be made: If the nose or cheeks become frosted, as will certainly happen sooner or later to one traveling in a very low temperature, *do not rub snow upon the frosted part*. Snow rubbed on is pretty certain to fracture and remove sections of the skin. The Eskimo way is to hold or rub the frosted part with the bare hand until frost has been removed, and is far superior.

The clothing outfit above described will be found ample. Extra trousers or other extra outer garments are not needed. *Let all hang*

loosely upon the body. Nothing should fit snugly.

A pair of smoked or amber goggles should always be included in the winter outfit. Amber is more effective than smoked glass, though ordinarily the latter will do. The goggles should be fastened with a string to slip over the back of the head. *No metal should touch the flesh.*

The best low temperature sleeping bag is one of caribou skin made with the hair inside. Under ordinary conditions, however, a water-proofed canvas bag lined with good woolen blankets will do as well, though such a bag with sufficient blanket lining to give it warmth equal to that of the caribou skin bag would be much heavier and more bulky than the latter. A bag lined with four thicknesses of llama wool duffle (that is, four thicknesses over and four beneath the sleeper), however, should not weigh more than ten pounds, and would correspond in warmth to one lined with blankets weighing twenty pounds.

An A or wedge tent will be found the best model for winter travel. A sheet-iron tent stove *with bottom* and telescoping pipe will make the tent warm and snug. The tent should be fitted with an asbestos ring at the stovepipe hole as a protection. A pack cloth

or tarpaulin will serve as an adequate and comfortable tent floor.

It is never safe or advisable for one to travel in the wilderness alone, for a sprained ankle or broken leg in an isolated region would be more than likely to result in death.

In the Hudson Bay country two pounds of flour, one pound of fat pork, with baking powder, tea and sugar, form the daily ration for a man. It is well when possible to carry frozen fresh meat, free from bone, with a proportion of desiccated vegetables to vary the diet. Butter makes a tasty variety to the fat, for it will remain sweet at this season. Prunes and chocolate are both worth while.

Or if the journey is to be extended the menu may be simplified by the introduction of pemmican and the elimination of other articles. Pemmican is the best condensed food ever invented for cold weather work. One pound of pemmican and a quarter pound of pilot biscuit, as a daily ration, will sustain a man at hard work, though it will prove a monotonous diet. The above is merely suggested as a basis. It may be expanded or contracted as circumstances require without disturbing its mean value. Let it be remembered, however, that ordinary bread and other moist foodstuffs will freeze as hard

as stone. Jerked venison and desiccated vegetables make tasty and sustaining additions to the ration, and will not freeze.

A man is supposed to be able to haul at good speed upon a toboggan a load equal to his own weight. Therefore two men, each weighing 150 pounds, should between them haul 300 pounds. Camp equipment, tent axes, guns, bedding, extra underclothing and all personal belongings of both, if proper care be exercised in selection, should weigh not to exceed 140 pounds. Add 80 pounds of food, and we have 220 pounds, or a maximum load of 110 pounds for each. The tent and general camp outfit is indeed sufficient for four men. It is presumed that the aluminum cooking outfit previously described will be chosen. Some eliminations, as, for example, that of the folding baker, might easily be made without serious loss of comfort.

To secure the load upon the toboggan, arrange the bags in which it is packed evenly, taking care that no part of the load extends beyond the sides of the toboggan. Adjust the tarpaulin or canvas ground cloth neatly over it. Secure one end of your lash rope to the side rope on one side at the rear. Bring the other end over and under the side rope opposite. Cross it back over the load and over and

under side rope to front of next crossbar, and so on to front crossbar, taking slack as you proceed. From front to rear criss-cross rope in same manner over load and under side ropes, forming diamonds where the rope crosses itself on top of load. Bring the end of rope under side rope at rear, take in all slack and tie.

CHAPTER XV

WITH DOGS AND KOMATIK

IN considering equipment for dog and sledge traveling, we must constantly bear in mind the necessity of keeping down weight and bulk. Not long since, while visiting the establishment of a New York City outfitter, I saw an equipment which a sportsman ambitious for experience with dogs and komatik (sledge) had selected for a month's journey which he was about to undertake. Exclusive of provisions there was enough material to weight down four eight-dog teams. Among other things was a specially designed tent stove that would have tipped the scales at upwards of one hundred pounds.

The would-be traveler declared with pride that he "did not intend to have cold camps." It certainly gave me "cold feet" to contemplate his outfit. It was the most ridiculous and impracticable conglomerate aggregation of camping material that I have ever seen put to-

gether, and I doubt if the would-be traveler ever found a sufficient number of dogs at any one point to transport it.

While it is the aim of every experienced camper to obtain the greatest degree of comfort of which circumstances will admit, the voyager with dogs cannot hope to carry with him the luxuries of a metropolitan hotel, and one soon learns how little after all is really necessary to make one comfortable.

How much weight a team of eight good dogs can haul depends upon the character of the country and the condition of the snow or ice. Under very favorable conditions I have seen such a team make good progress with twelve hundred pounds. Ordinarily, however, eight hundred pounds is a full load, and if much rough ice, hilly country or soft snow is encountered six hundred pounds will be found all too heavy. I have heard of cases, when traveling was exceptionally good, of dogs covering upwards of one hundred miles a day. The biggest day's travel I ever made with dogs was sixty miles, but often I have toiled day after day, pulling and hauling with the animals at the traces, lifting the komatik over rough places, or packing a trail for the team with my snowshoes, to find myself rewarded with less than ten miles when camping time arrived.

In selecting outfit the region to be visited will be a factor to take into consideration. It would be quite impossible to discuss adequately in a single chapter all the phases of dog travel to be provided for. We shall therefore leave out of consideration polar outfitting, or outfitting for other unusual work, which the reader of this will scarcely be likely to undertake.

The clothing suggested in the chapter on snowshoe and toboggan travel is equally well suited to travel with dogs and komatik. Should the voyager's ambition, however, draw him within the sub-arctic regions or across the Arctic Circle some additional protection will be needed.

In the far Arctic the natives wear trousers of either polar bear skin or caribou skin, with an upper garment of caribou skin called, in Greenland, the "kulutar;" in Labrador, the "kulutuk." The only difference between the adickey and the kulutuk is that the one is made of cloth, the other of caribou skin. In Ungava I supplied myself with caribou skin trousers, which, as is the custom there, I drew on over my moleskin trousers in windy or intensely cold weather.

The kulutuk takes the place of the moleskin adickey. That is to say, the kersey adickey worn under the kulutuk will be found ample

protection in any weather, and often the kulutuk of itself will be found sufficient.

Kulutuk and skin trousers are worn hair side out. Were they worn with the hairy side in, they would accumulate moisture exuded by the body, and the moisture would freeze, presently transforming the hair into a mass of ice. A friend of mine going to the Arctic for the first time as a member of one of Peary's early Greenland expeditions, turned his kulutuk inside out and donned it with the hairy side next the body. The Eskimos laughed, and resenting their levity he assured them it was much warmer worn in that manner than as they wore it. "No," said one of them, "if it were warmer worn that way the animals would wear their fur inside." My friend quickly learned by experience the logic of the Eskimo's argument.

Deerskin kulutuk and trousers are not easily purchased, though along any coast where seals are captured similar garments of sealskin may be procured, which, though not equal to deerskin garments, answer very well. The skin of the young harbor seal (the ranger seal) is best for the purpose, as skins of other species are too thick and heavy. When made of sealskin the upper garment is called a "netsek."

I discovered when traveling among them

that some of the Moravian missionaries of the Labrador coast wore a buckskin suit under their ordinary trousers and outer shirt. Such a suit is much lighter than deerskin trousers and kulutuk, and serves nearly as well. It is not difficult to purchase buckskin from which one may have such a suit made. It is wind-proof and very light.

All skin garments, including moccasins, should be sewn with animal sinew. Ordinary thread will quickly break out and will not do. Thread-sewn moccasins are factory-made, and will give very little service.

The types of snowshoes suggested in the chapter on snowshoe and toboggan travel are the types also best suited to dog and komatik work. Long snowshoes would be very much in the way when one has to go to the traces and haul with the dogs or lift and assist the komatik over rough places; and this becomes the rule rather than the exception as one goes North.

Let me insist that the web should be of good caribou babiche, and not the ordinary rawhide used in many of the snowshoes offered for sale. The former will not stretch when wet, while the latter will stretch and bag so badly as to render the snowshoe practically useless.

It is well to wrap the frame on either side

where the babiche is drawn around it, with buckskin or sealskin. Otherwise even a slight crust upon the snow will in time cut the babiche strands. Wrapping the snowshoe in this manner will at least double its life.

What was said in reference to tent, small sheet-iron stove and general camp and cooking outfit in the previous chapter will apply here, as well as directions heretofore given for packing in waterproof bags. In selecting the sleeping bag, give first preference to one of deer-skin.

In a barren region where firewood is not to be had, it will be necessary to carry an alcohol or kerosene burner and stock of fuel. The former is preferable on account of the low freezing point of alcohol. Alcohol or oil should be secured in tin cases. It is regularly put up in this way by dealers.

In such a region, too, it may be necessary to carry snow knives with which to cut blocks of snow for the erection of snow igloos as shelter. These knives resemble somewhat the machete. One cannot, however, learn to build a snow igloo properly without long practice. This phase of the work is merely referred to as interesting; for anyone traveling in a country where snow house shelter is necessary will secure the assistance of a native, who will attend

to proper sledge outfitting at the point of departure.

On regular lines of dog travel opportunities to renew the provision supply will frequently occur, and cabins for night shelter will be found. Therefore the food outfit will depend upon the country to be traversed. Where long stretches occur between supply points, however, fat pork, pilot bread, tea and sugar should form the basis. The very best possible food, however, for this work is pemmican, pilot bread, tea and sugar. Of course a little coffee may be carried, but it is bulky.

The traveler will make his selection carefully, building around pork, pilot bread and pemmican with other articles of food like desiccated vegetables from which water has been eliminated. Too much salt meat opens the door to scurvy, unless sufficient variation in the way of vegetables, fish, or fresh meat is introduced. Dessicated cranberries are an excellent preventive. A man can do good hard work day in and day out, as already stated, upon one pound of pemmican and a quarter pound of pilot bread as a daily ration, and such a ration offers no danger of scurvy.

Dog pemmican is the best dog food, and the lightest, for dogs will do pretty well upon one pound of pemmican each a day. To do well

the animals should be given plenty of fat, when pemmican is not available, though not a clear fat diet, for that will make them sick. Three-quarters of a pound of fat and three-quarters of a pound of meat or fish is an ordinary ration. Dogs are fed but once a day—at night.

The number of dogs in a team varies, but the average team is composed of seven or eight. Eight or nine is the most economical number so far as results are concerned.

In the Northwest dogs are harnessed tandem. This is the white man's method. In the Northeast they are harnessed fan fashion—the Eskimo method. That is to say, each dog has an individual trace secured to the end of a single thong, leading out from the bow of the komatik and called the bridle. The individual traces are of various lengths. The dog with the longest trace is the leader of the pack, and particularly trained to respond to the driver's directions. The other dogs will follow his lead.

For open country and sea ice travel the Eskimo method is probably best, as the work is more evenly distributed and the driver can always tell whether each dog is doing his share of the work, but for narrow trails and woods travel the tandem method is more practicable.

Dogs are good, bad and indifferent. One seldom has an opportunity to pick one's dogs discriminately, and rarely may one purchase them outright unless contracted for a year in advance, for the native dog owner seldom maintains animals in excess of his requirements in the ordinary routine of his life. The traveler will usually be able, however, to hire a team by employing the owner to drive it, and the owner of a team will get much more work out of his dogs than a stranger to the dogs can hope to do.

At least a year's experience is necessary to enable a white man to handle a dog team with anything approaching efficiency, and even then one cannot hope to approach the performance of an Eskimo. The failure to enlist Eskimos as dog drivers has been the real cause of the failure of many an Arctic expedition.

It is advised, then, that the traveler employ at so much per day or for the trip driver and dogs. It is an unsafe experiment to start off with a dog team unattended by an experienced man. The owner of the team will supply also the necessary dog harness, his own dog whip and general dog traveling paraphernalia, including the komatik.

Sledges or komatiks vary in different localities as to width, length and minor methods of

construction. The average komatik is two feet wide and ten feet long but as stated, they vary in different localities, a uniform width being maintained to suit the local conditions of the region in which they are used. For example, wide and comparatively short komatiks are employed in Quebec, while the Ungava komatik is but sixteen inches wide. These latter komatiks are usually fifteen or sixteen feet in length, however. The runners stand ten inches high. This is, in fact, the heaviest and most efficient komatik I have ever seen. Each runner is made from a single piece of timber and is from two and one-half to three inches thick. It is designed for the roughest possible use, and is, I believe, better adapted to this purpose than the Greenland komatik because more substantially built. The latter is peculiar in that it has upstands at the rear for guiding it.

Crossbars, extending an inch or so on either side of the runners and from one to two inches apart, are lashed into place with rawhide. When the rawhide shrinks the komatik becomes firm. Iron fastenings being rigid would break too readily, particularly in intense cold, to be reliable.

The traveler will do well, therefore, to purchase if he does not hire his komatik at the point of departure, as in so doing he will se-

cure one of correct design for the region to be traversed.

It is well to have a box made the width of the komatik two or three feet long, and about fourteen inches deep to lash upon the rear end of the komatik in which cooking utensils and a portion of the food supply, as well as odds and ends, may be carried. This should be supplied with a hinged cover, and hook or clasp by which the cover may be securely fastened down.

The best lash for securing the load in position is one of sealskin, though ordinary hemp rope will do. Before lashing, the tarpaulin should be neatly folded over the top of load to protect it.

One end of the lash is secured to an end of the crossbar at the forward end of the load, brought across the load and under the other end, then across, skipping a couple of cross-bars, and back again skipping a couple of cross-bars, thus threading it from side to side under the ends of every second or third crossbar to the rear bar, where it is brought across the load to the opposite end of this crossbar and crisscrossed across the load again to the forward crossbar to be tied.

OUTING

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Two hundred titles are projected. The series covers all phases of outdoor life, from bee-keeping to big-game shooting. Among the books now ready or in preparation are those described on the following pages.

OUTING PUBLISHING COMPANY
OUTING MAGAZINE Yachting OUTING HANDBOOKS
141-145 WEST 36TH ST. NEW YORK 122 S. MICHIGAN AVE. CHICAGO

THE AIREDALE, by Williams Haynes. The book opens with a short chapter on the origin and development of the Airedale, as a distinctive breed. The author then takes up the problems of type as bearing on the selection of the dog, breeding, training and use. The book is designed for the non-professional dog fancier, who wishes common sense advice which does not involve elaborate preparation or expenditure. Chapters are included on the care of the dog in the kennel and simple remedies for ordinary diseases.

"It ought to be read and studied by every Airedale owner and admirer."—Howard Keeler, Airedale Farm Kennels.

APPLE GROWING, by M. C. Burritt. The various problems confronting the apple grower, from the preparation of the soil and the planting of the trees to the marketing of the fruit, are discussed in detail by the author. Chapter headings are:—The Outlook for the Growing of Apples—Planning for the Orchard—Planting and Growing the Orchard—Pruning the Trees—Cultivation and Cover Cropping—Manuring and Fertilizing—Insects and Diseases Affecting the Apple—The Principles and Practice of Spraying—Harvesting and Storing—Markets and Marketing—Some Hints on Renovating Old Orchards—The Cost of Growing Apples.



THE AUTOMOBILE—Its Selection, Care and Use, by Robert Sloss. This is a plain, practical discussion of the things that every man needs to know if he is to buy the right car and get the most out of it. The various details of operation and care are given in simple, intelligent terms. From it the car owner can easily learn the mechanism of his motor and the art of locating motor trouble, as well as how to use his car for the greatest pleasure. A chapter is included on building garages.

BACKWOODS SURGERY AND MEDICINE, by Charles S. Moody, M. D. A handy book for the prudent lover of the woods who doesn't expect to be ill but believes in being on the safe side. Common-sense methods for the treatment of the ordinary wounds and accidents are described—setting a broken limb, reducing a dislocation, caring for burns, cuts, etc. Practical remedies for camp diseases are recommended, as well as the ordinary indications of the most probable ailments. Includes a list of the necessary medical and surgical supplies.

The manager of a mine in Nome, Alaska, writes as follows: "I have been on the trail for years (twelve in the Klondike and Alaska) and have always wanted just such a book as Dr. Moody's Backwoods Surgery and Medicine."

THE BULL TERRIER, by Williams Haynes. This is a companion book to "The Airedale" and "Scottish and Irish Terriers" by the same author. Its greatest usefulness is as a guide to the dog owner who wishes to be his own kennel manager. A full account of the development of the breed is given as also description of best types and standards. Recommendations for the care of the dog in health or sickness are included. The chapter heads cover such matters as:—The Bull Terrier's History—Training the Bull Terrier—The Terrier in Health—Kennelling—Diseases.

CAMP COOKERY, by Horace Kephart. "The less a man carries in his pack the more he must carry in his head", says Mr. Kephart. This book tells what a man should carry in both pack and head. Every step is traced—the selection of provisions and utensils, with the kind and quantity of each, the preparation of game, the building of fires, the cooking of every conceivable kind of food that the camp outfit or woods, fields or streams may provide—even to the making of desserts. Every recipe is the result of hard practice and long experience. Every recipe has been carefully tested. It is the book for the man who wants to dine well and wholesomely, but



in true wilderness fashion without reliance on grocery stores or elaborate camp outfits. It is adapted equally well to the trips of every length and to all conditions of climate, season or country; the best possible companion for one who wants to travel light and live well. The chapter headings tell their own story. Provisions—Utensils—Fires—Dressing and Keeping Game and Fish—Meat—Game—Fish and Shell Fish—Cured Meats, etc.—Eggs—Breadstuffs and Cereals—Vegetables—Soups—Beverages and Desserts.

"Camp Cookery is destined to be in the kit of every tent dweller in the country."—Edwin Markham in the *San Francisco Examiner*.

CANOE AND BOAT BUILDING, by Victor Slocum. All of us like to think we could build a boat if we had to. Mr. Slocum tells us how to do it. Designs are given for the various types of canoes as well as full descriptions for preparing the material and putting it together. Small dories and lapstreak boats are also included.

CATTLE DISEASES, by B. T. Woodward. Mr. Woodward takes up in detail the various common diseases to which cattle are liable. His book is designed for the aid of the practical farmer in cases where the skilled veterinarian is not necessary. A careful description of the various diseases is given and the accepted forms of treatment stated.

EXERCISE AND HEALTH, by Dr. Woods Hutchinson. Dr. Hutchinson takes the common-sense view that the greatest problem in exercise for most of us is to get enough of the right kind. The greatest error in exercise is not to take enough, and the greatest danger in athletics is in giving them up. The Chapter heads are illuminating. Errors in Exercise—Exercise and the Heart—Muscle Maketh Man—The Danger of Stopping Athletics—Exercise that Rests. It is written in a direct matter-of-fact manner with an avoidance of medical terms, and a strong emphasis on the rational, all-round manner of living that is best calculated to bring a man to a ripe old age with little illness or consciousness of bodily weakness.

"One of the most readable books ever written on physical exercise."—Luther H. Gulick, M.D., Department of Child Hygiene, Russell Sage Foundation.



FARM DRAINAGE & IRRIGATION, by W.J. McGee. Sometimes it is necessary to spend money to get water on the land; sometimes to get it off. Mr. McGee has studied the question from both angles in his work for the Department of Agriculture and this book will contain his latest and fullest conclusions. Particular attention will be paid to the matter of sub-surface irrigation to which little heed has been given until lately.

FENCING, by Edward Breck. Dr. Breck was for many years one of the best-known amateur fencers in America and is acquainted with the best swordsmen of the present day, here and abroad. His book is a practical guide for those who wish to know the most approved practice in the use of the foil, duelling sword, or saber. Suggestions are given on training and condition, as well as on the finer points of the game.

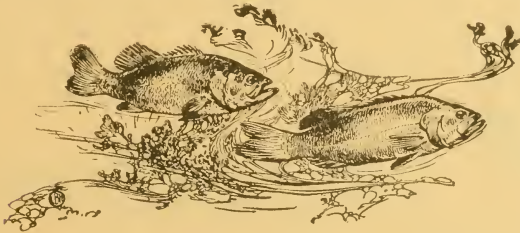
THE FINE ART OF FISHING, by Samuel G. Camp.

Combines the pleasure of catching fish with the gratification of following the sport in the most approved manner. The suggestions offered are helpful to beginner and expert anglers. The range of fish and fishing conditions covered is wide and includes such subjects as "Casting Fine and Far Off", "Strip-Casting for Bass", "Fishing for Mountain Trout" and "Autumn Fishing for Lake Trout". The book is pervaded with a spirit of love for the streamside and the out-doors generally which the genuine angler will appreciate. A companion book to "Fishing Kits and Equipment". The advice on outfitting so capably given in that book is supplemented in this later work by equally valuable information on how to use the equipment.

"Will encourage the beginner and give pleasure to the expert fisherman."—*N. Y. Sun.*

FISHING KITS AND EQUIPMENT by Samuel G.

Camp. A complete guide to the angler buying a new outfit. Every detail of the fishing kit of the freshwater angler is described, from rod-tip to creel, and clothing. Special emphasis is laid on outfitting for



fly fishing, but full instruction is also given to the man who wants to catch pickerel, pike, muskellunge, lake-trout, bass and other freshwater game fishes. Prices are quoted for all articles recommended and the approved method of selecting and testing the various rods, lines, leaders, etc., is described.

"A complete guide to the angler buying a new outfit."—*Peoria Herald.*

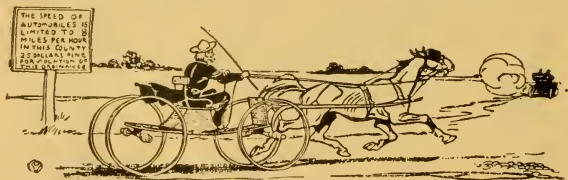
FISHING WITH FLOATING FLIES by Samuel G.

Camp. This is an art that is comparatively new in this country although English anglers have used the dry fly for generations. Mr. Camp has given the matter special study and is one of the few American anglers who really understands the matter from the selection of the outfit to the landing of the fish. His book takes up the process in that order, namely—How to Outfit for Dry Fly Fishing—How, Where, and When to Cast—The Selection and Use of Floating Flies—Dry Fly Fishing for Brook, Brown and Rainbow Trout—Hooking, Playing and Landing—Practical Hints on Dry Fly Fishing.

THE FOX TERRIER, by Williams Haynes. As in his other books on the terrier, Mr. Haynes takes up the origin and history of the breed, its types and standards, and the more exclusive representatives down to the present time. Training the Fox Terrier—His Care and Kenneling in Sickness and Health—and the Various Uses to Which He Can be Put—are among the phases handled.

THE GASOLINE MOTOR, by Harold Whiting Slauson. Deals with the practical problems of motor operation. The standpoint is that of the man who wishes to know how and why gasoline generates power and something about the various types. Describes in detail the different parts of motors and the faults to which they are liable. Also gives full directions as to repair and upkeep. Various chapters deal with Types of Motors—Valves—Bearings—Ignition—Carburetors—Lubrication—Fuel—Two Cycle Motors.

GUNSMITHING FOR THE AMATEUR, by Edward C. Crossman. Mr. Crossman, who is one of the best-known rifle experts in the country, takes up in detail the care and repair of the gun. He discusses such questions as The Present Development of the Gun—Tools for the Amateur—Rifle Barrels—Smooth Bore Barrels—Rifle Actions—Pistol and Gun Actions—Refinishing and Processing—The Stock, Sights and Aids to Accuracy.



THE HORSE—Its Breeding, Care and Use, by David Buffum. Mr. Buffum takes up the common, every-day problems of the ordinary horse-user, such as feeding, shoeing, simple home remedies, breaking and the cure for various equine vices. An important chapter is that tracing the influx of Arabian blood into the English and American horses and its value and limitations. Chapters are included on draft-horses, carriage horses, and the development of the two-minute trotter. It is distinctly a sensible book for the sensible man who wishes to know how he can improve his horses and his horsemanship at the same time.

INTENSIVE FARMING, by L. C. Corbett. A discussion of the meaning, method and value of intensive methods in agriculture. This book is designed for the convenience of practical farmers who find themselves under the necessity of making a living out of high-priced land.



LAYING OUT THE FARM FOR PROFIT, by L. G. Dodge. One of the farmers' great problems is to put every acre of his land to the best possible use. This book discusses the methods of obtaining this result. The author is an investigator for the Department of Agriculture and has given particular attention to this subject.

THE MOTOR BOAT--Its Selection, Care and Use, by H. W. Slauson. The intending purchaser is advised as to the type of motor boat best suited to his particular needs and how to keep it in running condition after purchased. The Chapter headings are: Kinds and Uses of Motor Boats--When the Motor Balks--Speeding of the Motor Boat--Getting More Power from a New Motor--How to Install a Marine Power Plant--Accessories--Covers, Canopies and Tops--Camping and Cruising--The Boathouse.

NAVIGATION FOR THE AMATEUR, by Capt. E. T. Morton. A short treatise on the simpler methods of finding position at sea by the observation of the sun's altitude and the use of the sextant and chronometer. It is arranged especially for yachtsmen and amateurs who wish to know the simpler formulæ for the necessary navigation involved in taking a boat anywhere off shore. Illustrated with drawings. Chapter headings: Fundamental Terms--Time--The Sumner Line--The Day's Work, Equal Altitude, and Ex-Meridian Sights--Hints on Taking Observations.



OUTDOOR PHOTOGRAPHY, by Julian A. Dimock. A solution of all the problems in camera work out-of-doors. The various subjects dealt with are The Camera--Lens and Plates--Light and Exposure--Development--Prints and Printing--Composition--Landscapes--Figure Work--Speed Photography--The Leaping Tarpon--Sea Pictures--In the Good Old Winter Time--Wild Life. The purpose of the book is to serve as a guide not only for the man or woman who has just taken up the use of the camera, but also for those who have progressed far enough to know some of the problems that confront them.



OUTDOOR SIGNALLING, by Elbert Wells. Mr. Wells has perfected a method of signalling by means of wig-wag, light, smoke, or whistle which is as simple as it is effective. The fundamental principle can be learnt in ten minutes and its application is far easier than that of any other code now in use. It permits also the use of cipher and can be adapted to almost any imaginable conditions of weather, light, or topography.

"I find it to be the simplest and most practical book on signalling published."—Frank H. Schrenk, Director of Camp Belgrade.

"One of the finest things of the kind I have ever seen. I believe my seven year old boy can learn to use this system, and I know that we will find it very useful here in our Boy Scout work."—Lyman G. Haskell, Physical Director, Y. M. C. A., Jacksonville, Fla.



PACKING AND PORTAGING, by Dillon Wallace. Mr. Wallace has brought together in one volume all the valuable information on the different ways of making and carrying the different kinds of packs. The ground covered ranges from man-packing to horse-packing, from the use of the tump line to throwing the diamond hitch. The various chapters deal with Packing and the Outfit—The Canoe and Its Equipment—Camp Equipment for the Canoe Trip—Personal Equipment—Food—The Portage—Travel with Saddle and Pack Animals—Saddle and Pack Equipment—Adjusting the Pack—Some Practical Hitches—Traveling Without a Pack Horse—Afoot in Summer—With Snowshoes and Toboggan—With Dogs and Komatik.

PRACTICAL POULTRY KEEPING, by R. B. Sando. In effect a comprehensive manual for the instruction of the man who desires to begin poultry raising on a large or small scale and to avoid the ordinary mistakes to which the beginner is prone. All the statements are based on the author's own experience, and special care has been taken to avoid sensationalism and exaggeration. The general contents are Poultry Keeping and Keepers—Housing and Yarding—Fixtures and Equipment—Choosing and Buying Stock—Foods and Feeding—Hatching and Raising Chicks—Poultry Diseases. Illustrated.

PROFITABLE BREEDS OF POULTRY, by Arthur S. Wheeler. Mr. Wheeler discusses from personal experience the best-known general purpose breeds. Advice is given from the standpoint of the man who desires results in eggs and stock rather than in specimens for exhibition. In addition to a careful analysis of stock—good and bad—and some conclusions regarding housing and management, the author writes in detail regarding Plymouth Rocks, Wyandottes, Orpingtons, Rhode Island Reds, Mediterraneans and the Cornish.

"This is an invaluable book for those who would make a success in the poultry business."—Grand Rapids, (Mich.) Herald.

RIFLES AND RIFLE SHOOTING, by Charles Askins. A practical manual describing various makes and mechanisms, in addition to discussing in detail the range and limitations in the use of the rifle. Among other things, the chapters deal with The Development of the American Breech-Loading Rifle—Single Shot Rifle—Lever-Action Repeater—Pump-Action Repeater and



Military Bolt-Action—Double Rifle—Rifle and Shotgun—Self-Loading Rifle—Rifle Cartridges, Miniature and Gallery—Small Game—Match-Rifle Cartridges and Their Manipulation—High Power, Small Bore Hunting Cartridges—Big Bore, High Power Cartridges—Trajectory, Accuracy, and Power of Hunting Cartridges—Weight of Rifle and Recoil—Stocks and Triggers—Rifle Sights—Positions for Rifle Shooting—Outdoor Target Shooting,—Quick Firing and Running Shots—Faucy Snap and Wingshooting—Two-Hundred Yard Sharpshooting.

SCOTTISH AND IRISH TERRIERS, by Williams Haynes. This is a companion book to "The Airedale", and deals with the history and development of both breeds. For the owner of the dog, valuable information is given as to the use of the terriers, their treatment in health, their treatment when sick, the principles of dog breeding, and dog shows and rules.

"The happy owner of a terrier for the first time could not go wrong if he follows Mr. Haynes' advice."—Brooklyn Standard Union.

SPORTING FIREARMS, by Horace Kephart. This book is the result of painstaking tests and experiments. Practically nothing is taken for granted. Part I deals with the rifle, and Part II with the shotgun. The man seeking guidance in the selection and use of small firearms, as well as the advanced student of the subject, will receive an unusual amount of assistance from this work. The chapter headings are: Rifles and Ammunition—The Flight of Bullets—Killing Power—Rifle Mechanism and Materials—Rifle Sights—Triggers and Stocks—Care of Rifle—Shot Patterns and Penetration—Gauges and Weights—Mechanism and Build of Shotguns.



TRACKS AND TRACKING, by Josef Brunner.

After twenty years of patient study and practical experience, Mr. Brunner can, from his intimate knowledge, speak with authority on this subject. "Tracks and Tracking" shows how to follow intelligently even the most intricate animal or bird tracks. It teaches how to interpret tracks of wild game and decipher the many tell-tale signs of the chase that would otherwise pass unnoticed. It proves how it is possible to tell from the footprints the name, sex, speed, direction, whether and how wounded, and many other things about wild animals and birds. All material has been gathered first hand; the drawings and half-tones from photographs form an important part of the work, as the author has made faithful pictures of the tracks and signs of the game followed. The list is: The White-Tailed or Virginia Deer—The Fan-Tailed Deer—The Mule-Deer—The Wapiti or Elk—The Moose—The Mountain Sheep—The Antelope—The Bear—The Cougar—The Lynx—The Domestic Cat—The Wolf—The Coyote—The Fox—The Jack Rabbit—The Varying Hare—The Cottontail Rabbit—The Squirrel—The Marten and the Black-Footed Ferret—The Otter—The Mink—The Ermine—The Beaver—The Badger—The Procupine—The Skunk—Feathered Game—Upland Birds—Waterfowl—Predatory Birds. This book is invaluable to the novice as well as the experienced hunter.

"This book studied carefully, will enable the reader to become as well versed in tracking lore as he could by years of actual experience."—Lewiston Journal.

WING AND TRAP-SHOOTING, by Charles Askins.

The only practical manual in existence dealing with the modern gun. It contains a full discussion of the various methods, such as snap-shooting, swing and half-swing, discusses the flight of birds with reference to the gunner's problem of lead and range and makes special application of the various points to the different birds commonly shot in this country. A chapter is included on trap shooting and the book closes with a forceful and common-sense presentation of the etiquette of the field.

"It is difficult to understand how anyone who takes a delight in hunting can afford to be without this valuable book."—*Chamber of Commerce Bulletin, Portland, Ore.*

"This book will prove an invaluable manual to the true sportsman, whether he be a tyro or expert."—*Book News Monthly.*

"Its closing chapter on field etiquette deserves careful reading."—*N. Y. Times.*

THE YACHTSMAN'S HANDBOOK, by Herbert L.

Stone. The author and compiler of this work is the editor of "Yachting". He treats in simple language of the many problems confronting the amateur sailor and motorboatman. Handling ground tackle, handling lines, taking soundings, the use of the lead line, care and use of sails, yachting etiquette, are all given careful attention. Some light is thrown upon the operation of the gasoline motor, and suggestions are made for the avoidance of engine troubles.



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